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SECTION OF TUBERCULOSIS

MONDAY AFTERNOON, JUNE 10, 1929

THE Section of Tuberculosis of the Massachusetts Medical Society, held in the Copley-Plaza Hotel, Boston, convened at two forty-five o'clock, Dr. John B. Hawes, 2d, of Boston, presiding.

CHAIRMAN HAWES: Dr. Griffin and I, in preparing the program for this afternoon, have had one point in view, and one only, that is to make these papers of value to the general practitioners in Massachusetts and in New England. I fully realize that there are men in this room to whom everything that will be said here will be an old story, but after all it is not for those of us who come here year after year and who for many years have been connected with the tuberculosis campaign in Massachusetts that this section is intended, for the tuberculosis section of the Massachusetts Medical Society is for the general practitioner, to help him handle his problems. After all, the tuberculosis problem is not yet ended. The fact that the mortality during the last 20 years has been decreased from 300,000 to 100,000 does not mean that we have completed our job.

I feel that this is an eminently practical program. The first paper on the program is "Hemoptysis, Pleurisy with Effusion, Spontaneous Pneumothorax." The general practitioner is bound to meet each one of these complications frequently. We are very fortunate in having a man from a sister state, the State of Connecticut, which state in many ways has gone far ahead of Massachusetts in handling its tuberculosis problem, to speak to us on this first topic.

I take pleasure in introducing Dr. Hugh B. Campbell, of the Norwich State Tuberculosis Sanatorium, Norwich, Connecticut. (Applause.)

COMPLICATIONS OF TUBERCULOSIS—HEMOPTYSIS, PLEURISY AND SPONTANEOUS PNEUMOTHORAX

BY HUGH BAIRD CAMPBELL, M.D.*

THOUGH the title assumes a definite diagnosis of tuberculosis made, it is difficult at the outset to refrain from speaking of hemoptysis and pleurisy as symptoms of the disease, as so frequently even in this decade they are so lightly considered in relation to the more grave sequelae of which they may be forerunners.

The statistics of ten or fifteen years ago which attributed 90% to 95% of the cases expectorating blood to pulmonary tuberculosis may have been high but in the light of our present knowledge, aided to a large degree by improved laboratory and x-ray technique, an estimate of 80% would not seem to be far out of the way. The histories of our Sanatorium patients abound yet too freely in the false sense of safety given to many a patient by the earlier diagnosis "that the blood he spat was from the nasopharynx or the bronchial tubes". Surely, the day should have passed when either ignorance or an unwarranted fear to tell the patient the truth, would permit such statements.

Evidence is constantly accumulating also that far more than a majority of individuals developing pleurisy with effusion are merely showing a tuberculous condition secondary to a focus previously existing in the lung itself. The work of Opie and McPhedran is confirmatory of this observation.

It is the opinion of Landis that hemoptysis or an attack of pleurisy are two of the ways in which a pulmonary tuberculosis may suddenly manifest itself in an individual who is apparently healthy. He further states that the mathematical chances of tuberculosis being present are overwhelming in the case of any individual who has a hemoptysis, an attack of pleurisy, a fistula in ano, or transient attacks of slight hoarseness and this holds true, in the face of previous good health and excellent physical condition.

Expectoration of blood may occur in any case of pulmonary tuberculosis in any amount and

*For record and address of author see "This Week's Issue," page 432.

the amount does not necessarily have any bearing on the size of the lesion. As a rule, streakings and small amounts may have their origins in congested bronchial mucosa or in small parenchymal lesions, and more copious hemorrhage in cavity formation of various sizes, but I have seen hemorrhages of twelve to twenty ounces occurring with alarming frequency in a patient in whom only the most diligent search, clinically and x-ray wise, revealed the lesion and whose sputum never showed tubercle bacilli.

As stated, blood either in small amounts or streaked or rusty sputum in all probability has its origin from the congested mucosa of a bronchus or from an engorged or congested parenchymatous lesion.

Frequently, acute respiratory infections are superimposed upon a tuberculous infection—the so-called colds are designated as causative factors, but I am not sure but that in many of these cases the wish is father to the thought—the tuberculosis pure and simple being the real sinner.

As a rule the large and consequently more grave hemorrhage has its source from an aneurysmal vessel in a cavity. Sacculation develops progressively as the destruction of the lung tissue deprives the vessel of support and reinforcement until either increased pressure or actual ulceration causes a rupture of the vessel wall. Such hemorrhage per se, is rarely fatal. Of 4000 cases at the Sanatorium at Norwich observed in over a period of sixteen years, in only about 10, has hemorrhage produced immediate death. One of these cases had his hemorrhage while at stool, the others were undergoing no unnatural or unnecessary strain. A number of deaths have been indirectly due to hemorrhage either from a post hemorrhagic pneumonia, or an acute spread of the tuberculosis.

As in so many other conditions tuberculous and otherwise, no specific has been discovered or developed for which favorable results can be guaranteed. Obviously, as in the general treatment of tuberculosis, absolute rest in the recumbent position is imperative. Frequently the nervous condition of the patient necessitates a hypodermic of an eighth or quarter grain of morphia. The quiet and relaxation which this produces, more than compensates for the untoward effects which may result from the retention of mucus or blood, and the irritation and vibration of coughing.

An ice bag to the chest may not have any therapeutic effect but it certainly has in most cases a marked psychological effect. No food should be given for several hours after a hemorrhage, then very light diet, liquids in restricted amounts. Obviously, the patient should be fed.

If the bowels do not move naturally, daily, an enema is the method of choice, though Dr. Lawrence Flick has over a period of years, routinely used Sat. Solution of Mag. Sulph. in small doses. To control the hemorrhage, such drugs have been used as—calcium lactate, ergot, nitroglycerine, amyl nitrite, horse serum and adrenalin, without any noteworthy effects. Minor, some years ago, read a paper on the use of digitalis for hemorrhage. It contained nothing conclusive.

We have used artificial pneumothorax in a number of cases, some with good results, others not so good. If the patient has a unilateral lesion, and the affected lung lies free in the thorax it should be productive of the desired end. Unfortunately too few of our cases have been of this type. Either they have been bilateral or the poor lung has been adherent in part so that the compression is not general. The result may be either a failure to compress the bleeding part, or a compression which prevents the exit of blood and mucus. In persistent bleeders however, it should be attempted. It is wise to reiterate that absolute rest is imperative—and that rest for a period of weeks. Only a cursory examination of the chest should be attempted.

PLEURISY

Before discussing pleurisy as a complication of pulmonary tuberculosis, I cannot refrain from again emphasizing the fact that pleurisy manifests itself frequently as the first symptom of the aforesaid disease. It must not be overlooked however, that this is a secondary manifestation of disease, already existing in the parenchyma of the lung, at least, in the great majority of cases. Too often this fact is either minimized or overlooked to the end that later the patient presents himself with a well-developed case of pulmonary tuberculosis and with a much lessened possibility of arrest or cure. Neither must it be forgotten that a pleurisy with a sero-fibrinous effusion, developing insidiously is practically always tuberculous.

Lord, in "Diseases of the Bronchi, Lungs and Pleura" states that tubercle bacilli have been demonstrated in from 22% to 85% of pleural effusions. Quite frequently, they cannot be demonstrated microscopically from smear. If, however, cultures are made, subsequent examinations will reveal the growths in the test tubes, as well as microscopically. This fact has assumed increased importance in view of the more and more accepted theory of the cyclic life of the tubercle bacillus. It is assumed that its failure to show in the original smear is not due to its absence but to its absence in bacillary form. It may be present either as an ultra microorganism, or in the coccal form of its life cycle.

The records of Phipps Institute show that of 5895 cases, in whom a diagnosis of tuberculosis was made, 23.8% gave a history of previous pleurisy. In the face of these facts, a physician is jeopardizing the life of his patient in minimizing the seriousness of this condition.

In the pleurisies occurring as a complication of pulmonary tuberculosis, in our sanatorium experience, we have not seen a great many cases presenting effusion to any considerable amount except as may occur occasionally in artificial pneumothorax. Many patients do develop local-

ized pleurisies—various sized inflammatory patches which subsequently form adhesions tying up the lung to the chest wall.

Naturally these patients present the most marked symptoms of pleurisy, namely pain, but few show any marked areas of dullness or flatness, significant of fluid. It is our feeling that in such as do develop fluid, especially with the opposite lung in good condition, the fluid should be removed, at least in part, and replaced with nitrogen gas or air. This obviously prevents the visceral pleura from becoming adherent to the parietal, thereby permitting the possibility of later collapse if it be deemed necessary. We are discouraged time and again in our endeavor to perform artificial pneumothorax in apparently suitable cases to find the pleura adherent.

It is quite evident from autopsy studies, as well as from the attempts to induce artificial pneumothorax, that many cases of tuberculosis have had in their medical history, pleurisies of varying magnitude without being aware of the same. Apical pleurisies are very common but are less likely to be accompanied by pain than are the basal on account of the restricted excursion of the lungs at the apices.

As stated, many of our patients manifest the characteristic pains of pleurisy. This is frequently relieved by the application of heat or by strapping with moleskin plaster, the latter used in its full width, six or eight inches, rather than in the narrower strips. It is essential to obtain immobilization that the strapping be from the good side in front to the good side in back, and with the patient in full expiration. Frequently, salicylates or even codein or morphine are required to control the pain.

We have seen at the Sanatorium at Norwich three cases of pleural effusion due to endothelioma or carcinoma of the pleura. These all occurred in individuals over forty years of age, without previous history of tuberculosis; following aspiration there was a tendency for the fluid to reaccumulate rapidly not once, but several times and the progressive weakness of the patient was out of proportion to that observed in a simple pleurisy.

It was noted that the effusion was not at all times bloody. Ross, *Medical Journal*, December, 1914, reported 60 cases of malignant disease involving the mediastinum in whom there was effusion in 29, of which, 15 were hemorrhagic.

Pulmonary tuberculosis is the most frequent cause of pneumothorax. Males are more frequently affected than females. It is most common in young adult life, obviously because of the greater incidence of tuberculosis, in that age. Though it may exist to the extent of 10% in autopsy cases, Lord states that in a series of clinical cases (Drasches 10212), the proportion was lower—198 or 1.93%. Other causes are pulmonary abscess—bronchiectasis, empyema, and emphysema. There is another group in which induced pneumothorax has produced a perforation of the pleura by too great traction on an attached pleura with a consequent tear. Such accidents are more likely to occur in the early stages of pneumothorax treatment than in the later stage when following repeated refills the pleura has become thickened.

Though adult tuberculosis in the vast majority of cases has its beginning at the apex of the lung, pneumothorax is comparatively rare there, due no doubt to the greater chronicity of the disease and the consequently more thickened pleura in that area. By the same token the perforation is more likely to occur in the lower lobes, where the disease is more recent. The rupture may result from a tubercle on the pleura itself or from a caseous area, underlying the pleura breaking through.

The onset of perforation may be sudden or it may be of a more lengthy duration. This naturally depends upon the type of tear or perforation. Most of the cases observed in the Sanatorium at least, in our experience, show a sudden development.

The collapse may be complete or partial—the tear may permit such an influx of air into the chest cavity, as to completely compress the lung or the flap on the perforated lung may act as a one way valve allowing ingress but no egress with a constantly increasing positive pressure.

Localized pleurisies may so tie the visceral pleura to the chest wall, as to permit only partial pneumothorax. We have seen some cases of perforation in definitely tuberculous lungs followed by the re-ëxpansion of the affected lung, in a comparatively short length of time.

As a rule there are two symptoms which predominate in spontaneous pneumothorax, namely, sharp stabbing pain in the affected side, and increasing dyspnoea or air hunger. Symptoms of shock are likely to ensue with cyanosis, cold sweat, rapid thready pulse, and possibly coma.

Should consciousness be retained, the patient most frequently assumes a sitting position, body forward. Inspection reveals immobility of the affected side—palpation reveals diminished or absent vocal fremitus and displacement of the cardiac impulse.

Percussion early shows hyperresonance—later becoming flat, if fluid develops. The area of cardiac dullness is displaced. The extent of the flatness depends of course, on the amount of fluid.

On auscultation one finds either absent or suppressed breath sounds but frequently there is a distinct metallic quality to respiration. Metallic tinkle and the succussion splash occur in the presence of fluid and the coin test is pathognomonic. This latter, Lord states is probably due to the peculiar resonating qualities of the pneumothorax cavity.

Pneumothorax in tuberculosis, is generally a grave complication—is frequently further complicated by infection of the pleural cavity—

pyopneumothorax—and in the great majority of cases, hastens death.

The treatment consists of absolute rest—morphine to ease the pain, and quiet the cough, and strapping of the chest with moleskin plaster. In the valvular type of case, deflation may have to be resorted to. Fluid, provided it remains sterile, is sometimes a blessing in disguise, as the exudate may provide the means of obliterating the opening.

Some x-ray lantern slides demonstrate more graphically the points already suggested.

1. A. M. A female of fifteen years of age. Hemorrhages of large amounts—that is many ounces—over a period of two to three months. Clinically signs were practically negative—the referring physician was inclined to a diagnosis of blood from the stomach though there were no symptoms referable to gastric disease. X-ray report as follows:

Moderate parenchymatous infiltration extending out of both roots to the apices along the paravertebral region as well as along the first interspace trunk on the right. Both roots are fibrous in appearance and show calcified glands. There is a small area of parenchymatous infiltration at the bifurcation of the main bronchi, of the left lower lobe. On Sanatorium routine—hemorrhage ceased, patient gained 18 pounds in weight, and cure is now being continued at home.

2. J. H. Male, 27 years of age, far advanced case of pulmonary tuberculosis. This plate is shown because this individual was one of our cases whose immediate death was due to pulmonary hemorrhage. Death ensued from hemorrhage in ten minutes.

3. W. O. This patient, a male of 36, has been a most frequent bleeder and we are of the opinion his bleeding comes from the area which shows the most marked pathology—the left upper lobe. His tuberculosis is chronic, his resistance is good and his right lung and left lower are at present fair. It seems hardly fair to sacrifice the good lung he has, in his left lower, which would be the result in a thoracoplasty—consequently he is at present at the Royal Victoria Hospital, Montreal, where Dr. Edward Archibald plans to do an apicolysis. It is needless to state that many attempts to bring about an artificial collapse of this lung have been futile. Phrenicotomy has been done by Dr. Samuel Harvey.

4. A. C. Reference has been made to treatment of pulmonary hemorrhage by artificial pneumothorax. This slide demonstrates a good result obtained by this method. Patient, male, referred to us from Asheville, North Carolina, where compression has been instituted following copious hemorrhage. Has been at Norwich Sanatorium for past year, where refills have been continued to date. General condition is good, no clinical signs of activity on opposite side. Will probably be discharged in fall. Lung will re-expand if permitted.

7-8-9. V. C. This series of plates shows a chest previous to, during, and following pleurisy with effusion. This girl had several pneumothorax treatments, developed a localized spontaneous pneumothorax, and subsequently effusion. After bed rest for three months, x-ray showed nearly complete absorption of fluid and for past six months the patient has been working as head nurse.

10. Ruth C. Female, 18 years of age. Illustrative of two points, previously mentioned. First that pleurisy pain was first symptom indicative of tuberculosis, and the plates demonstrate beautifully an interlobar pleurisy. One is impressed further, with the extent the tuberculous process attained, before coming under medical care.

W. C. 11. Male, 27. This slide demonstrates a partial pneumothorax collapse, being confined to upper lobe of left lung, adhesions preventing collapse of lower lobe. It will be noted that the tuberculosis shown in this lung seems to be of an acute type. This patient had not been aware of any development of pneumothorax.

J. D. 12 and 13. Single, male, 26 years of age. This slide shows a rare phenomenon. The history is that this patient, apparently in good health, in April, 1922, when 19 years of age, while in school in Massachusetts, during a walk, jumped from a stone wall and immediately noted sharp stabbing pain in chest together with marked shortness of breath. The school doctor made a diagnosis of muscle strain, and following a week in bed, school work was continued until June. In that month, passed life insurance examination and during the summer danced, swam and bowled. During this period dyspnoea was the only but a most marked symptom. In August a physician following x-ray examination told him he had athletic heart. (Plate overexposed and overdeveloped—really showed nothing of the sort, but did show spontaneous pneumothorax which was unrecognized at that time.) Referred to Norwich Sanatorium in November, 1922, by physician who made a diagnosis of spontaneous pneumothorax. From the history we were quite convinced that such a condition had existed since April, 1922. The same condition maintains today. No fluid has ever developed, and very good health has been the rule all these years. It has been suggested that deflation should have been done in this case, but in view of all the circumstances we did not feel justified in such interference.

F. O'B. 14-15-16-17. This plate to demonstrate pneumothorax requiring deflation or removal of air. Four years ago it was necessary to remove from this patient, 2000 CC of air every second or third day, later 500-600 every four to six weeks. On the entrance of the needle there was positive pressure of 10, till about 1000 CC had been removed, then fluctuation showed in the manometer. Relief was instantaneous, and there has been no fluid at any time.

G. B. 18. This slide shows a therapeutic pneumothorax with subsequent development of fluid, which is held at different parts of the chest by adhesions; four distinct fluid levels being visible.

C. J. 22. This slide shows a localized spontaneous pneumothorax of the base of the upper right lobe, the upper part of this lobe is held by adhesions, the middle and lower lobes are not collapsed on account of consolidation and adhesions.

CHAIRMAN HAWES: I am sure you will agree that there are many, many points of a very real and practical nature in Dr. Campbell's paper.

To start the discussion, I should like to bring up some points myself.

DISCUSSION

DR. JOHN B. HAWES, Boston: First I should like to speak about the ice bag and its effect on hemorrhage. I have always felt that the ice bag did good because it is a slippery thing and it is hard to hold on the chest unless the patient

keeps still. Aside from that I cannot see that it is of any value whatsoever.

Next in regard to not feeding the patient, I have accepted the theory for many years that diet in a hemorrhage must be extremely limited because I was taught so; now, however, I can see no conceivable reason why after a hemorrhage, unless it is a perfectly terrific thing, a patient should not eat what he pleases, hot or cold food, or anything else. My patients are so instructed.

I did not notice that Dr. Campbell spoke of posture, that of sitting the patients fairly upright in bed after they have had hemorrhages, with at least three pillows. I have always felt if you let the patient lie flat, the blood is apt to sag back into the lower part of the lung.

Morphine: I have often wanted to give it to every member of the patient's family, but very seldom to the patient. Atropine is the only drug for which I personally have any use. That is accepted by both the Saranac Lake and the Asheville group as practically the only drug that does good.

Absolute rest: In every case I think it is well to explain to the patients, if their mentality is such that they can understand it, the two classes of hemorrhages, one, the toxic hemorrhage which Dr. Campbell referred to, and the other a mechanical hemorrhage. To my mind the treatment of these two kinds of bleeding is very different. Of course the treatment inside a sanatorium must perforce be different from the treatment outside. I remember one patient of mine with a chronic, well-marked tuberculosis, who had a very copious hemorrhage the morning of her wedding day. For reasons which need not be gone into here, it was important for that marriage to take place then. When she called me up I said, "You had better go ahead and get married." I sat in the front pew of the church and was considerably worried as to whether she was going to spoil a white satin dress, but she did not. She has lived for the past five years up in Saranac, having had a thoracoplasty done.

The only other point I would make is what Dr. Campbell said about pleurisy and strapping. Even in these fairly enlightened days I frequently see patients whose chests have been admirably and excellently strapped, with the exception of the fact that the strapping comes only to the median line in front and in back. I fail to see how strapping under these circumstances can do any good whatsoever. The strapping, of course, must have a leverage on the other side.

On the question of spontaneous pneumothorax, I cannot help referring to a young man who came to me some eight or ten years ago with a spontaneous pneumothorax on the left side which had been diagnosed as angina pectoris by a certain professor here in Boston. A year later he came to me with a spontaneous pneumothorax on the right side which had been diagnosed as acute gall-bladder disease by an equally eminent professor of medicine at a medical school here in Boston. At present he is a perfectly well and healthy man. I have the x-ray showing the spontaneous pneumothorax on both sides.

Dr. E. O. Otis, Boston: With regard to pulmonary hemorrhage, one may make two general classes: first, the hemorrhage which occurs in the early or moderately advanced stages and which in the great majority of cases is not fatal and subsides, or would subside whether we apply any active treatment or not. The second class of hemorrhage is that which occurs in advanced stages with cavity where an aneurysmal sac ruptures in the cavity and which is almost invariably fatal. A patient with a cavity may apparently be in good general condition but there is always the danger that a rupture of the aneurysmal sac may take place and a fatal result follow. I recall a case of just this kind where, one afternoon when the nurse was out, the fatal hemorrhage occurred and the patient suddenly died. Therefore, one should always watch out for this tragic result in any case of advanced tuberculosis with cavity.

The next point I wish to refer to is with regard to the use of morphine in cases of hemorrhage, which is apparently used in comparatively large doses, and I believe unnecessarily. In this use of morphine, I believe that there is the danger of setting up a broncho-pneumonia which in itself may be fatal. If any preparation of opium is to be used, in my experience codeine answers every purpose. As for other drugs, I believe that nitrite of sodium or amyl nitrite are of value. I recall the case of a physician who had chronic tuberculosis and was subject to hemorrhages, who always carried with him, wherever he travelled, amyl nitrite which he found was effective whenever he had a hemorrhage, which often occurred.

Again, one must remember that there is hemoptysis which occurs from causes other than pulmonary tuberculosis. We all know that this may happen in cardiac disease, and I have seen hemoptysis which I believe was the result of cirrhosis of the liver. We may obtain streaked sputum, which often frightens the patient, from some slight abrasion in the upper respiratory tract. Hemoptysis may also occur from other lung conditions besides pulmonary tuberculosis. There are still other cases of hemorrhage in which we can find no evidence of any disease whatever in the lungs, either by x-ray or physical examination, and we are simply unable to make a diagnosis as to the cause in these mysterious cases.

Although, as I have said, hemoptysis in the early stages of the disease almost invariably subsides whatever one does or does not do, yet one, of course, has to employ some treatment, both to satisfy the patient as well as anxious friends. I do not believe that in every case

it is necessary to keep the patient in bed for too long a time,—the traditional two weeks, but that of course will depend upon the individual case. We all know that there are many cases of hemoptysis occurring in working people, in which no attention is paid to the blood spitting and the man goes on working and nothing happens.

With regard to the posture, I practically allow the patient whatever position in bed is the most comfortable, either on the back or side, recumbent or semi-recumbent.

Finally, the advice of Dr. Jackson in his book written many years ago, I believe is still good and sufficient for most cases of hemorrhage in the early stages, and that is to remain quiet and keep one's mouth shut.

As for external applications, one always advises the conventional ice bag over the chest. That it does any particular good, I have never been able to determine.

Dr. Olin S. Pettingill, Middleton, Mass.: We are indebted to Dr. Campbell for presenting such a good summary of the above conditions.

In regard to prognosis and treatment, we divide hemorrhage of the lung into two classes: those with fever and those without fever. One is apparently due to trauma and the other is an accompaniment of activity of the disease. Death from hemoptysis usually occurs before the physician reaches the patient, even if he is in the sanatorium. The thing which we find does the most harm is extension of disease after hemoptysis.

Care should be exercised in the use of morphine as it may destroy the cough reflex, allowing blood to remain in the bronchi and thereby favoring development of bronchopneumonia or septic pneumonia with resulting extension of disease.

The same applies to posture. Some prefer a sitting position as routine and others elevate the foot of the bed, the idea being to allow the effect of gravity to control hemorrhage. We, at Essex, allow the patient to assume a comfortable position. I have no definite ideas in regard to posture in hemoptysis. Nervousness of the patient should receive consideration.

Pneumothorax treatment in one-sided cases where we are sure the blood comes from the involved lung, is the only treatment for hemorrhage that is really efficient. We have all seen cases where the results have been almost instantaneous. If pneumothorax treatment is to be tried, it should be started within twenty-four hours after hemorrhage begins, before a septic pneumonic process develops.

Spontaneous pneumothorax is a rather common complication as seen in a sanatorium. The one way valve action, as described, may result in death of the individual because of lack of air. When cyanosis and dyspnoea become marked we insert a needle, attaching rubber tubing to the needle, the opposite end of the tubing being in some fluid below the level of the patient. This usually relieves cyanosis in a very few minutes. We allow this to remain for a day or two, but if the condition returns after that, of course we replace it. This relieves the intrathoracic pressure.

Chairman Hawes: If there is no further discussion, I will ask Dr. Campbell if he has anything to add.

Dr. Hugh B. Campbell, Norwich, Conn.: Of course there is a good deal of personal opinion in this treatment of pulmonary hemorrhage. I wouldn't have you understand that we routinely give morphine to our patients. We are so situated that we don't have to give morphine to all the family. I am very glad of that, but there are a certain number of cases who are quite restless and nervous and it is quite essential, it seems to me, that they have a sedative, and my personal belief is that an eighth grain of morphine, which is usually the amount we give, does not do them any harm.

As to the posture, I think that the patient with one pillow under him is in much better position than propped up where he can to a large extent use his arms and be more inclined to move around than if he is lying flat with one pillow under him.

As regards the eating, that, of course, too, I think is a matter of opinion. My opinion is, the less you give the gastro-intestinal tract to do, as well as the body in general, the quieter you are going to keep the patient. (Applause.)

Chairman Hawes: The next paper is "Tuberculosis of the Intestines," by one who has labored long in the field, from whom we don't hear as often as we should like, Dr. Walter A. Griffin, of Sharon. It is full of practical points. There is one group of physicians who seem to think that every patient of tuberculosis who has a stomach ache must have a tuberculous complication in his intestines. Some of us do not think so. I trust Dr. Griffin in his long experience will help us in some of these points.

TUBERCULOSIS OF THE INTESTINES

BY WALTER A. GRIFFIN, M.D.*

HISTORICALLY it has long been noted that looseness of the bowels frequently comes on in the last stages of consumption. Even Hippocrates said, "Diarrhea attacking a person with phthisis is a mortal symptom." This symptom was, however, about all that was known of the association of consumption and ulceration of the intestines until about a hundred years ago when pathological studies showed the frequent occurrence of such ulceration in those dying of pulmonary tuberculosis. Diagnosis during the life of the individual, however, at a stage when therapeutic help may be of value, has only been possible for about a decade. Before that time clinical guesses from symptoms and signs were occasionally proved correct, but it has been through roentgenological studies of the barium meal that real surety in diagnosis has been possible. The technique has been worked out most carefully by Brown and Sampson, of Trudeau, N. Y., and presented in their book "Intestinal Tuberculosis" in 1926. Some observations had been made by other authors before this, notably by Stierlin in 1911 and by Pirie in 1917, but these earlier writers did not make a detailed study of the condition nor present their work in such a way that it received general recognition.

Because of the paucity of clinical symptoms of tuberculosis of the intestines it might be supposed that the condition is rather rare. Brown and Sampson state, however, that it is the most frequent complication of pulmonary tuberculosis and occurs rather often even in those cases that we have considered to have minimal chest signs. In the far advanced cases it is almost exceptional not to find it. It therefore becomes almost aphorismic to say that the comparatively early case with intestinal ulceration becomes far advanced and hopeless more quickly and more surely than the case that does not have this complication; while, on the other hand, if the early stages of the complication can be discovered and cured the pulmonary condition has far greater chance of healing. Until recently such early discovery has been impossible and even a definite diagnosis of the complication in pulmonary cases coming to autopsy has been made in only about a third of the cases, because of the lack of clinical symptoms and physical signs.

Let us consider for a moment the diagnostic possibilities of the condition by history taking and physical examination. In one hundred cases autopsied at the Phipps Institute, seventy-six had tuberculous ulceration in the intestines. For signs in these seventy-six, there were diarrhea, 40+%, pain 28%, abdominal tenderness 30+%, abdominal rigidity 25%. But in the twenty-four without ulceration, diarrhea was present in 29+%, and the other symptoms in practically the same percentage as in the ulcerated cases. Other authors have shown similar discrepancies between clinical records and autopsy findings.

Turning to laboratory helps, we may find tubercle bacilli in the feces, but without doubt in every productive pulmonary case some sputum is swallowed and is discharged with the stools, while in cases of ulcerated bowel it is probable that tubercle bacilli are rather rarely thrown off from the ulcers. Again, blood in the stools may be of slight value, but it may be present in many other conditions and is not reliable. A leucocytosis is also found at times, but it gives no characteristic picture. Hence, ordinary laboratory methods are of slight value. Because, then, of the indefinite clinical and laboratory signs, cases of chronic pulmonary tuberculosis that present indefinite possibilities of trouble in the intestines, such as anorexia, distress after eating, troublesome looseness or sometimes unusual constipation, and fail to gain weight, should be suspected of having tuberculosis of the bowels.

It has been said that real diagnostic help may be had from the x-rays. The reason for this depends on the fact that the majority of cases, especially the early cases, show ulceration, if at all, in the terminal ileum, the cecum and the ascending colon. There are two main anatomical reasons for this, one being that the intestinal contents having been hurried through the jejunum and upper ileum here begin to go more slowly, and the other reason is that here is found the richest supply of lymphoid tissue and tubercle bacilli are found in lymphoid tissue primarily in every tuberculous invasion.

It happens that the ileo-cecal region can be seen rather easily on the x-ray film because of its anatomical position and shape, but if there are ulcerated spots in this region the opaque diagnostic meal is hurried over this portion of the gut and in consequence throws little or no shadow on the x-ray film (Stierlin's sign). If, then, after a period of six to nine hours following the ingestion of the barium meal, there are noted filling defects of this part of the bowel; and further, if the meal has been practically wholly passed from the intestinal tract in twenty-four hours, showing general hypermotility, the diagnosis is established in most instances.

In the treatment of tuberculosis of the intestines there are certain general measures to be used as well as certain drugs, mechanical appliances and food regulations. Often symptoms

*For record and address of author see "This Week's Issue," page 432.

may be definitely abated by these means, and even cures affected, more frequently in recent years than ever before.

For general measures it is well to keep the patient with diarrhea very quiet and warm, since both exercise and cold tend to increase peristaltic action. Food should be as non-irritating as in the treatment of gastric ulcer. In fact, it is well at times to reduce the food to milk, buttermilk, soft cereals and possibly eggs, making such additions as may be possible from time to time. It frequently happens that in favorable cases almost any article of food may be given after a short time.

Medicines are often of value in the condition to relieve special symptoms. Thus, opiates and belladonna may be used for pain, as bismuth or astringents for diarrhea, to mention only a few of the host of drugs that have been recommended. The one outstanding drug for the condition is calcium chlorid. Some observers claim a specific action for it. It is best given intravenously, usually 5 c.c. of a 5% solution. By mouth it has little value. There are claims that it reduces pain and checks the diarrhea largely because of its action on the enervation of the intestine.

The best recorded results in treatment have been brought about by the use of artificial heliotherapy. Brown and Sampson have proved cures by this means, checking their observation by x-ray examinations before and after the use of the lamps. At Saranac Lake the quartz mercury vapor lamp has been most used although the carbon arc would seem to be as good, though less easily controlled by the patient. The radiations are given over the entire amount of body surface and increasing as rapidly as the individual's skin will allow until finally a good amount of pigmentation has been created when the treatment may be given for about two hours a day.

Unfortunately, artificial heliotherapy is expensive and at times patients cannot afford to continue its use for the necessary number of months. As a substitute direct sun baths may be taken during some seasons of the year, but the treatment is bound to lapse in the winter months.

There have been some recent experiments made by McConkey and Smith, of Raybrook, N. Y., on the value of cod liver oil and tomato juice in tuberculosis of the intestines. They claim as good results as with heliotherapy, or even better gains in weight, and certainly the treatment is readily available to all.

The x-rays have been used to help the condition and good results have been obtained. The rays must be given cautiously and only by those who appreciate the dangers which may go with their use in intestinal disease.

Finally, surgery has been employed and portions of diseased gut have been resected or side tracked. Before the proved value of heliotherapy this measure seemed to be at times a wise choice. A few cases were cured by the surgeon, but the death rate was so high that for the most part patients now are relegated to his care only when conditions are exceptional.

The prognosis of tuberculosis of the intestines has changed very greatly since the work of Brown and Sampson has become known. Many cases can be treated with a fair expectation of cure, and the ulcerated areas have been healed in spite of an advancing and fatal pulmonary tuberculosis. In general, the chances are the same as in any tuberculous condition—the earlier the treatment is instituted the better the hope of arrest or cure.

CHAIRMAN HAWES: Dr. Griffin's paper is now open for discussion.

DISCUSSION

DR JOHN B. HAWES, Boston: I should like to say two things. The first is to pay tribute to Brown and Sampson of Saranac who have brought so much light out of the darkness and so much cheer where before there was only despair. They have certainly shown us two things concerning which there can be no doubt: In the first place, that tuberculosis of the intestines is a curable disease, as proven so many times by consumptives who die of something else and who had never had any trouble with the intestines and yet in whose intestines tuberculous ulcers are found.

Next, that ultraviolet rays will do an enormous amount of good. There are those of us here in New England and elsewhere who believe that the ultraviolet rays coming from the sun in the heavens are equally good if not better than the ultraviolet rays coming from a lamp.

About the diagnosis by means of filling defects and the x-ray diagnosis, we cannot help having enormous respect for the opinion of Drs. Brown and Sampson. But we wish the other x-ray men were in entire accord about this. I have talked this matter over many times with men like Dr. Morrison, Dr. George, Dr. Leonard and Dr. Holmes of Boston. They do not altogether agree on this point. They all say that they have seen these filling defects in other conditions besides tuberculosis. Nevertheless, Drs. Brown and Sampson have made enormous contributions to this subject.

DR. HUGH B. CAMPBELL, Norwich, Conn.: I was very much interested in Dr. Griffin's paper. I think in Connecticut we are of the group that Dr. Hawes referred to, of those who believe that solar therapy has got a little on the artificial lamp. Even in the winter weather we have been able to obtain very good results with heliotherapy in a certain number of cases provided we keep them protected from cross drafts.

An interesting coincidence, as I came into the hotel last night I saw a boy here who, while not in the sanatorium, had been under my care outside of Norwich for a condition which we thought was intestinal tuberculosis. He took some treatment during the winter months of February, March, and April, and I don't believe we get a great deal more sun in Norwich than you do in Boston. The particular point I wanted to emphasize about it was that even in those months, as long as he was protected from cross drafts and actually in the sun the boy was perspiring so that the cold itself, provided sunlight existed, seemed to be no detriment.

We have used, and are using at the present time in ten or twelve cases, the calcium chloride which Dr. Griffin refers to, given intravenously, with definitely good results, at least as far as pain and looseness of the bowels are concerned. It certainly does give these patients who are suffering from this complication a great deal of satisfaction and comfort.

There is one other thing that Dr. Griffin mentioned about which I would like to know if anybody can give me any definite information. We say that adult patients swallow sputum. I would like to be informed if anybody knows if they actually do or to what extent sputum can be swallowed without an individual knowing it.

DR. B. T. CRANE, Rutland: I was interested in Dr. Griffin's paper, which has been well covered.

With reference to Dr. Campbell's question just now about the evidence of patients swallowing sputum, I think some of the physicians at Rutland State Sanatorium who are present might speak firsthand about some work they carried on there some years ago, carrying on stomach washings and thereby finding sputum in the stomach. As I remember the report, it was convincing that unmistakably the sputum had been swallowed. I do not remember in what percentage of cases, however.

CHAIRMAN HAWES: Dr. Emerson, have you anything to add to Dr. Crane's remarks?

DR. E. B. EMERSON, Rutland: I have nothing to add except a question. The other day we had a patient with extensive involvement of both tops, as shown by the stethoscope and the x-ray. That patient positively, emphatically denies any expectoration whatever. I would like to know what becomes of that sputum, whether he is unconsciously swallowing it, or whether the secretion is being absorbed. We occasionally run across cases of that kind where it seems incredible that they could have such extensive physical signs and no expectoration. I would like to know what becomes of the secretion in these cases, whether it is swallowed or absorbed.

In regard to experiments of washing out the stomach, I think that must have been done before my day in Rutland.

In regard to the use of the lamp, I don't believe that the lamp takes the place of the sun. I think it is a very valuable accessory when the sun does not shine. I think we should use both. I think without any question in the winter time when there is no sun the lamp gives these patients a tremendous amount of comfort, and relief. Certainly there is a psychological side to it, to say the least, and I really believe that it helps the condition of the bowels.

QUARTZ LIGHT THERAPY IN PULMONARY TUBERCULOSIS

BY FRANCIS E. O'BRIEN, M.D.*

PRACTICALLY all investigators agree that the mode of action of the sun's rays, whatever it may be, causes marked improvement in the general resistance of a patient.

Freiberg in an article in the *Journal of the American Medical Association*, stated that "it seems necessary to regard sunlight in its normal composition as something that we require to imitate in its entirety, rather than to seek to generate it artificially and in profusion in only certain of its known characters." It has been a physical impossibility to give all of our patients exposure by natural methods.

I had occasion to begin the use of Quartz Light Therapy in nineteen hundred and twenty-one. This work has been continued daily since that date and over seven hundred and fifty patients resident at the Sanatorium have been treated.

During that period we have read and re-read many articles pro and con regarding heliotherapy in pulmonary tuberculosis. Bronfin has reported unfavorably on the use of heliotherapy in far advanced pulmonary tuberculosis and LoGrasso and McCutcheon both favor this treatment in the minimal, moderately advanced and even in selected far-advanced cases.

Krusen came to the following conclusions in his studies. First that heliotherapy administered properly is of value in pulmonary tuberculosis. Secondly that the great majority of the patients like it and their mental reactions to treatment are thereby benefited. Thirdly that expectoration is apparently easier and slightly increased during the early stages of sun cure, which stage is followed by a diminution in the amount of sputum and a marked decrease in lung moisture. He also concludes that a slight aggravation of cough is noticed at the beginning of treatment and later appears to be permanently diminished. He states further that hemoptysis is not a con-

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*For record and address of author see "This Week's Issue," page 432.

traindication to heliotherapy. Further observations indicate that the very far advanced or toxic cases should not receive sun treatment.

My observations and work have been entirely with artificial heliotherapy and some experimentation with natural heliotherapy more for control purposes.

The purpose of this paper is definitely and conclusively to give the results obtained with artificial Quartz Light Therapy over a period of seven and one-half years. To consider results obtained by every investigator would be a gigantic task and impossible for me.

To invite comparative investigations and results of previous investigations over a period of time and a study of all data received would be of great import to the clinician working with pulmonary tuberculosis.

We may hope for a specific in the chemical field as is announced by the Associated Press. We may look with enthusiasm upon any new and accepted discovery or symposium of research work. After all, we welcome as does the patient afflicted, all efforts and results that are, or will be of benefit to the patient.

We are justly proud of the declining death rates in pulmonary tuberculosis and we all feel that the Sanatoria, the Tuberculosis Associations, the Clinics and every agency working in tuberculosis work have played their parts.

Each factor has been an aid and as we have no positive cure, we must utilize every possible aid in reducing our present rates to a still lower figure.

This paper will endeavor to describe the results obtained in fifty selected cases covering a period of seven and one-half years.

These cases are cases that cover all stages of pulmonary tuberculosis and are living today. They are cases selected because of opportunity to study them over a fair period of time and to draw conclusions.

The cases selected were cases who lived near the local institution and could be followed up over a long enough period.

Twenty per cent. of the cases were employed at the institution after discharge from treatment in order that further study might be made.

The remaining cases are within telephone and visit call and have all been interviewed within the past month.

Significant data from other cases pertinent to this paper will be noted in order to illustrate findings.

The author has attempted to prove that artificial heliotherapy has not been detrimental as an adjunct in the treatment of pulmonary tuberculosis, but has been a most excellent aid in sanatorium treatment.

Method of treatment: Our method of treatment by Quartz Light has been a simple and uniform procedure arrived at after experimentation with various procedures. We experimented with exposures of small areas of the body starting with the ankles to final exposure of the entire body during a period of weeks. Because of necessity we finally decided upon exposure of the entire body at each treatment the best method.

In the beginning we used a more or less hit or miss method of treatment allowing every patient that could be transported to the treatment-rooms to be exposed. We finally stopped treatments on the very far advanced cases with a few exceptions. Our main reason was because of the effort required on the part of the patient and the resultant loss of strength going to and from the treatment room.

The ultimate method of treatment arrived at was as follows:

Patients were given two-minute exposure on the anterior surface of the body and two-minute treatment of the posterior surface of the body for the first treatment. The distance of the lamp from the surface of the treatment table was thirty inches.

Each successive treatment was increased by two minutes until patient was receiving one-half hour's exposure on each surface of the body. Patient received fifteen treatments over a period of forty-five days. Patients were then allowed to stop treatment for fifteen days. Male patients then started new course of treatment, starting with a two-minute exposure with the lamp twenty-four inches from the surface of the body, for a period of two minutes, the next treatment is increased by one minute and the lamp lowered one inch until the patient is taking fifteen minutes' exposure with the lamp eleven inches from the body surface. Treatment is stopped for two weeks and then started over again as per last course of treatment.

First Course of Treatment			*Subsequent Courses of Treatment*		
Plan 1			Plan 2		
Day	Inches	Time (min.)	Day	Inches	Time (min.)
1	30	2	1	24	2
3	30	4	3	23	3
6	30	6	6	22	4
9	30	8	9	21	5
12	30	10	12	20	6
15	30	12	15	19	7
18	30	14	18	18	8
21	30	16	21	17	9
24	30	18	24	16	10
27	30	20	27	15	11
30	30	22	30	14	12
33	30	24	33	13	13
36	30	26	36	12	14
39	30	28	39	11	15
42	30	30	42	10	15

Male patients were given plan number 1 as the first course of treatment and subsequent treatments were by plan number 2. The female patients were given only plan number 1.

Patients were exposed first on the entire anterior surface of the body and then were re-

quired to take an equal exposure of the posterior surface of the body.

All patients wore goggles to protect the eyes and also wore a loin cloth. Female patients were exposed in the same manner with the addition of a small protective band across the nipples.

Whenever a patient missed a treatment the time of the next treatment was reduced to correspond with that of two previous treatments, in order to prevent overexposure and the appearance of an erythema.

Little or no erythema was caused by our method of treatment. When a patient reacted and showed erythema that did not disappear subsequent treatments were stopped until the erythema disappeared.

Physical Classification of Cases Receiving Artificial Heliotherapy

Far Advanced	12	Moderately Advanced	28
Minimal	10	Total	50

The above classification was based upon physical signs, x-ray film and clinical symptoms.

Physical Classification of Control Cases

Far Advanced	6	Moderately Advanced	11
Minimal	8	Total	25

Complete Courses of Treatment

Number of Patients	Complete Courses of Treatment	Total Exposures	Exposures per Patient
1	1	30	30
7	2	420	60
14	3	1260	90
5	4	600	120
8	5	1200	150
5	6	900	180
5	7	1050	210
4	8	960	240
0	9	000	000
1	10	300	300
Total 50		6720	

A

Psychic Effect of Treatment

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Liked T.	11	27	10	48	96
Disliked T.	1	1	0	2	4

Note: Both patients complained of the odor generated by lamp and stated that it gave them a headache. Correction of ventilation in treatment room remedied this condition.

B

Effect of Treatment on Expectoration

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
No Expec.	0	5	3	8	16
Expec. unchanged	3	7	3	13	26
Expec. inc.	3	6	1	10	20
Expec. dec.	6	10	3	19	38

BB

Expectoration in Control Cases

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
No Expec.	1	2	3	6	24
Expec. unchanged	3	4	3	10	40
Expec. inc.	3	3	2	8	32
Expec. dec.	1	0	0	1	4

C

Effect of Treatment on Cough

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
No cough	0	5	1	6	12
Cough unchanged	2	10	3	15	30
Cough inc.	3	6	1	10	20
Cough dec.	7	7	5	19	38

D

Effect of Treatment on Lung Moisture

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Increased	1	2	0	3	6
Decreased	8	25	7	40	80
Unchanged	3	2	2	7	14

Note: Two cases of moderately advanced group had pleurisy with effusion as did one of advanced group. One case was tapped and the other two were not.

DD

Lung Moisture in Control Cases

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Increased	2	2	2	6	24
Decreased	1	4	2	7	28
Unchanged	3	5	4	12	48

E

Effect of Treatment on Weight

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Wt. increased	5	19	9	33	66
Wt. decreased	5	5	1	11	22
Wt. unchanged	3	3	0	6	12

EE

Weight in Control Cases

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Wt. increased	2	4	5	11	44
Wt. decreased	4	6	2	12	48
Wt. unchanged	0	1	1	2	8

F

Effect of Treatment on Temperature

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Norm. throughout	7	17	7	31	62
Diminished	3	6	2	11	22
Increased	2	2	0	4	8
Unchanged	0	3	1	4	8

FF

Temperature in Control Cases

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Norm. throughout	2	5	1	8	32
Diminished	0	2	2	4	16
Increased	3	4	4	11	44
Unchanged	1	0	1	2	8

G

Effect of Treatment on Hemoptysis

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Never hemoptysis	5	17	7	29	58
History of, but none during treatments	4	8	2	14	28
History of, and hemoptysis during treatments	2	2	1	5	10
No history of but hemoptysis during treatments	1	1	0	2	4

GG

Hemoptysis in Control Cases

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Never hemoptysis	4	5	5	14	56
History of, hemoptysis but none during comparative period	2	2	2	6	24
History of and hemoptysis during study period	2	2	1	5	20

H

Effect of Treatment on Appetite

	Far Advanced	Moderately Advanced	Minimal	Total	Per Cent.
Appetite the same	7	14	3	24	48
Appetite worse	2	4	1	7	14
Appetite better	3	10	6	19	38

I

Effect of Treatment on Menstruation in Thirteen of Cases

Increased menstrual flow	2	15.385 per cent.
Menstruation absent and started during treatment	2	15.385 per cent.
Menstrual flow decreased	0	000000 per cent.
No effect on menstrual period	8	61.54 per cent.
Symptoms lessened	1	7.69 per cent.

Note: One case had just commenced second course of treatment and menstrual period was over two days prior to treatment. This case menstruated two more days starting seven hours after treatment.

J

Sanatorium Census of Studied Group

Total number of sanatorium days	23,265
Average stay per patient	465.3
Shortest residence	98 days
Longest residence	1,574 days

K

Number of Patients	Year of Discharge
4	1923
7	1924
8	1925
12	1926
11	1927
7	1928
1	1929

L

Physical Classification of Cases April, 1929

Arrested	30
Apparently arrested	11
Quiescent	9

M

Occupations of Patients Since Discharge and Present

Waitress	1	Roadside stand owner	1
Waiter	2	Clerk	3
Orderly	2	Night baker	1
Nurse	5	Telephone operator	2
Chauffeur	6	Technician	1
Home	9	Refrigerating engineer	1
Attendant	4	Printer	1
Gardener	1	Race track agent	1
Watchman	2	Reporter	1
Farmer	2	Resort manager	1
Salesmen	3		

All of these patients were advised as to occupation and in most instances positions were secured for them.

RESULTS

We found that the patients really enjoyed the exposures to the rays and found them to have a sedative effect and rarely would a patient appear late for treatment. See A.

Expectoration was decreased in the greater percentage of cases and the results correspond with those of Krusen in his work with natural heliotherapy. See B.

The effect on cough was noticeable more after the second courses of treatment when cough became diminished in most of the cases. The results here correspond with those of Krusen. See C.

A remarkable decrease in lung moisture was noticeable near the completion of treatment in eighty per cent. of the cases. See D.

Differing from results of Krusen I found by far the greater percentage of cases gained weight. This gain was noticeable from the beginning of treatment. See E.

Temperature was diminished in a much greater percentage of cases in my series than in the cases of Krusen with natural heliotherapy.

History of hemoptysis was not taken into consideration in cases elected for study or on any case given quartz light therapy. These cases, however, were watched closely and results are tabulated in Table G.

Seven cases had hemoptysis during treatment. Fourteen cases had history of hemoptysis and did not have hemoptysis during treatment and have not since.

Appetite was bettered in a greater percentage of cases in my series with artificial heliotherapy than in Krusen's series with natural sun light.

The majority of female cases suffered no effect from exposures as regards menstruation. A small percentage of cases resumed normal menstruation under light treatment after suppression had occurred for a period.

CONCLUSIONS

1. Artificial heliotherapy combined with sanatorium routine is a valuable adjunct in the treatment of pulmonary tuberculosis.
2. It is an effective aid in assisting the reduction of temperature and building up the general resistance of the patient.
3. The very far advanced cases with high temperature do not gain any advantage in artificial heliotherapy because of effort required in treatment.
4. Hemoptysis is not a contraindication to artificial heliotherapy.
5. Artificial heliotherapy without rest treatment would not be very beneficial in pulmonary tuberculosis.
6. A marked decrease in lung moisture and decrease in severity of cough is especially noticeable with quartz light therapy.
7. There is no advantage in producing erythema in treatment and gradual tanning is not necessary.
8. Artificial heliotherapy has a sedative effect upon the patient.
9. Artificial heliotherapy assists the natural healing processes in tuberculosis by assisting expectoration in the beginning and later in reducing the amount.
10. Careful study of the individual patient and further research in artificial heliotherapy combined with follow-up work should reveal further advantages of this adjunct in treatment of pulmonary tuberculosis.

Notes and assistance of John H. LeVitre, a patient who has devoted his entire time for seven years to daily work with quartz light treatment and to whom I give great credit in perfecting what I believe the best method of treatment of pulmonary tuberculosis with the quartz light.

REFERENCE

Krusen, F. H.: Heliotherapy in Pulmonary Tuberculosis. Amer. Rev. Tuberculosis, 1927, Vol. xvi, No. 2, 184.

CHAIRMAN HAWES: I will ask Dr. Griffin to close the discussion.

DR. WALTER A. GRIFFIN, Sharon: Diagnosis by x-ray has been questioned by some observers, most recently by Steinbach of the Montefiore Home. He read a paper two weeks ago at Atlantic City in which he did not agree in his percentages with the figures that Brown and Sampson have put out with regard to the diagnostic possibilities of the barium meal. Mr. Sampson discussed Dr. Steinbach's paper and simply said that in a series of cases they had been able to prove, by operation and by autopsy, with only one per cent. of error, that the diagnosis of intestinal ulceration could be thus made. Of course, there are other possibilities of filling defects, such as cancer, but where there is an advanced pulmonary condition the chances of cancer being present is fairly remote.

As regards heliotherapy, Dr. Rollier believes most thoroughly in direct sun treatment and proves its efficiency at Leysin. Nevertheless, it is a little hard for patients in New England to take sun treatment in their homes in the winter time, and if the lamp is available, it certainly would be an advantage, it seems to me, to carry on with it rather than try to rely on the sun.

I mentioned something about the work of McConkey and Smith in regard to tomato juice and cod-liver oil. I was deeply impressed by the papers that they presented at Atlantic City. In particular Dr. Smith spoke of experimental work in intestinal tuberculosis with guinea pigs. Previous to this, so far as I know, there has been no success in inducing tuberculous ulcerated conditions of the bowels in the smaller animals, but Dr. Smith was able to do so by feeding the guinea pigs on a vitamin deficient diet, and also giving them at the same time rather large quantities of tuberculous sputum. Those pigs, however, that received a full ration, including tomato juice and cod-liver oil, did not have ulceration of the intestines. So they feel very sure that if the diet has all of the vitamins A, B, C, and D, in good quantity, animals will be protected from having ulcerations, and Dr. McConkey feels positive from his observations that tuberculous ulcerations in man will be cured by such diet.

CHAIRMAN HAWES: The next paper is on "Laryngeal Tuberculosis." Dr. Griffin and I selected Dr. Olin S. Pettingill of Middleton to speak on this subject but he told me he was afflicted with some disease and was therefore un-

able to prepare a paper. The disease could not have been so very bad, however, because he is with us today.

Dr. Ernlund, of Boston, has kindly consented to take his place and will speak to us on this subject of laryngeal tuberculosis.

LARYNGEAL TUBERCULOSIS

BY CARL H. ERNLUND, M.D.*

TUBERCULOUS laryngitis is of interest to the internist because of the fact that it frequently occurs as a complication of pulmonary tuberculosis and its presence materially darkens the prognosis of that disease. It is practically always secondary to pulmonary tuberculosis, and there are only five or six cases on record where it was found to be primary, autopsy showing no lesion in the lungs.

Various statistics show that laryngeal tuberculosis occurs in from three to thirty-three per cent. of all cases of pulmonary tuberculosis, and at the State Tuberculosis Hospital of Maryland it was found to be present in fifteen and a half per cent. of the patients. Frequency increases with the duration of pulmonary disease, and in autopsies it has been found to be present in from forty-eight to eighty-three per cent. of all cases.

How does the infection reach the larynx? Louis, in 1825, advanced the theory of surface implantation. This is founded on the observation that most of the laryngeal lesions appear in the posterior portion of the larynx, which is the part where the sputum is most apt to collect.

The second theory is that of transmission through vascular and lymphatic channels. This was founded on the observation that tubercle bacilli are frequently met with under a healthy epithelium, but Frankel has shown that the bacilli are capable of penetrating healthy epithelium and leaving the surface intact.

The chief argument in favor of the second theory is supported by the fact that the larynx may remain unaffected in spite of its being constantly bathed in tuberculous sputum, that tuberculosis may develop in the larynx after the sputum has ceased to contain organisms and that the laryngeal involvement may be very extensive where there is little or no sputum passing over the larynx.

Tuberculous laryngitis is slightly more common in men than in women. This is not due to the male larynx being more susceptible to the disease than the female, but simply to the difference in mode of living. It occurs most frequently between the ages of twenty and forty, tapering at each end. It is rarely met with in childhood, and in a hundred autopsies, Mackenzie found it only once under ten years of age, four times between the ages of ten and fifteen, and sixteen times between the ages of fifteen and twenty.

Chronic catarrh of the nose and throat does not seem to predispose to laryngeal tuberculosis. Sedentary and dusty occupations are said to predispose to pulmonary tuberculosis but there are no statistics to show that these occupations predispose to laryngeal involvement.

The symptoms of laryngeal tuberculosis are not always proportionate to the extent of the laryngeal lesion and except for pain are mostly due to the pulmonary involvement rather than to the laryngeal lesion. The larynx is rarely involved unless preceded by general fatigue, depletion of strength, indigestion and progressive wasting.

In many of the early cases there are no symptoms at all that lead to the belief that the larynx is involved. Sir Saint Claire Thompson found that 11.9 per cent. of a series of 477 cases had no complaints at all referred to the throat. Laub, found that 64.9 per cent. had no laryngeal complaints at all, 32.5 per cent. had hoarseness and cough, and 2.6 per cent. had pain and dysphagia.

Changes in voice, that is, hoarseness and aphonia, are often the earliest symptoms. The voice is apt to be of low pitch, to tire easily, often being reduced to a hollow whisper. Of those that have symptoms of the throat paraesthesias are common, and patients are apt to complain of a feeling of uneasiness in the throat which they frequently attempt to clear by coughing.

True cough is not an important symptom of laryngeal tuberculosis, and when present is more apt to be due to the pulmonary lesion. The same is true for dyspnea. Pain and tenderness are seldom complained of except when there is perichondritis, but it may be due to infiltration of the muscular tissue and to neuritis of the superior laryngeal nerve. It is often referred to the ear. Dysphagia is common in fatal cases, and Mackenzie found it in one-third of 500 fatal cases.

The appearance of the larynx may vary greatly, depending on the location of the lesion, and inasmuch as the histology of the larynx varies considerably in different parts, no attempt will be made to describe in detail the various types of lesions that may be found. The lesions occur in the form of tuberculous infiltration, ulceration, tuberculoma, miliary tubercles, true edema, and cicatrix. The posterior portion of the larynx is more apt to be involved and this is probably due to the loose, papillated mucous membrane found in this region.

In 1880, Morell Mackenzie stated that "the prognosis of laryngeal phthisis is always extremely unfavorable and it is not certain that any cases ever recover." In his series the average expectancy of life was reduced to from 12

*For record and address of author see "This Week's Issue," page 432.

to 18 months, when there were serious throat symptoms. Today it is not unusual to find patients alive and fairly comfortable after five or more years. Prognosis in the first place, depends on the pulmonary, and in the second place on the extent and rapidity of progress of the laryngeal lesion. The laryngeal lesion may heal even when the process continues in the lungs.

It may be said that while multiple laryngeal lesions are unfavorable, the prognosis in single lesions is favorable.

Prognosis in regard to mortality: Patients with tuberculous laryngitis never die from this complication, except in those very few cases where there is sudden death due to edema of the larynx with asphyxia. Death is always due to the pulmonary disease, but when the complication is present the mortality rate is increased approximately a hundred per cent. Sir Saint Claire Thompson found that the mortality was 70 per cent. in a certain group that had pulmonary tuberculosis with laryngeal complications, and 37.5 per cent. in another group with similar lung involvement but without laryngeal tuberculosis.

Treatment: The general treatment and hygiene are of the utmost importance, but this aspect need not be covered in this paper and only a few points in regard to the local treatment will be emphasized here.

Voice rest is essential and in many instances symptoms of laryngeal involvement will disappear with this treatment alone. At the State Tuberculosis Hospital in Maryland it was found that 4 per cent. of the cases that had slight ulceration recovered without any other treatment except general hygiene.

Patients should be instructed to write instead of using their voice, and one must remember that a forced whisper can do much harm.

Tubercular ulcerations are best treated with galvanic cautery and it has been shown that the beneficial effect of this is not due to actual destruction of the tubercular tissue but because it promotes the formation of blood vessels and epithelioid cells in the avascular tuberculous areas. It was used many years ago by Sieberman, who cauterized all diseased tissues in the larynx at a single sitting. The result was said to be good but the reaction was most severe. Today the cautery is generally applied to small areas under local anesthesia and mild cases require two to three applications at monthly intervals whereas severe cases take from ten to twelve applications.

Sir Saint Claire Thompson has employed this method and found improvement in approximately 65 per cent. of his cases. The figures from the State Hospital in Maryland coincide with those of Dr. Thompson.

Heliotherapy has also been used, and the Finsen Institute in Copenhagen, reports cures in over 50 per cent. of their patients. The objection to this treatment is that it requires on the average 86 applications, each one of 2½ hours duration, given alternate days.

Sunlight has also been used by means of reflecting mirrors (Verba solar laryngoscope).

Alkaline sprays are useful in treating slight chronic laryngeal catarrh, but powders such as europhen and orthoform are worse than useless and simply cause irritation. Lactic acid has been used, but has no effect when employed in concentrations of less than 50 per cent.

Pain occurs in a small number of cases and may be extremely distressing; its severity is often out of all proportion to the size of the lesion.

In a certain number of cases it is necessary to inject the superior laryngeal nerve with alcohol which may give relief for from two days to several weeks. It seems however, that in cases that require repeated injections, resection of the nerve under local anesthesia, would be indicated.

Discussion

Chairman Hawes: I was somewhat amazed when Dr. Ernlund said that the use of whispered voice was worse than speaking in a low tone. I certainly must revamp my directions to my patients if that is so.

I presume that Dr. Ernlund has seen the ingenious arrangement of mirrors by which Dr. Gerald Webb, of Colorado Springs, teaches his patients how to reflect the sunlight directly down their own throats. I should think it would take a great deal of training, however, to teach patients to do that.

Is there any further discussion of Dr. Ernlund's paper?

Dr. E. B. Emerson, Rutland: I would like to say just a word; while the various drugs and cauterizations all have a place, it seems to me that the underlying basic treatment for tuberculous laryngitis is rest of the voice. We have for some years been instructing our patients to use a pad and pencil and not to whisper. If you can get 100 per cent. co-öperation of the patient with tuberculous laryngitis in voice rest, you will get results. I have certainly seen open lesions heal. I have in mind a third stage case that had several ulcerated areas who for over one year never used his voice even in a whisper. That larynx healed up, as far as one could judge, and I was able to follow him for a matter of about five years afterwards, and it remained healed.

These cases are certainly very distressing and we are oftentimes put to it to make life even temporarily bearable, but I believe if rest has any place in pulmonary tuberculosis, it certainly has a place in the treatment of laryngeal tuberculosis.

Chairman Hawes: A striking thing about laryngeal tuberculosis, as in the case of intestinal tuberculosis, is that it is no longer

necessarily a fatal complication. It is remarkable how its frequency has diminished. In talking with older laryngologists such as Dr. J. L. Goodale and Dr. Coolidge of this city, who were in the Throat Department of the Massachusetts General Hospital thirty or more years ago, they tell me that they almost never see cases of tuberculous laryngitis in their own practice nowadays. That is very encouraging.

Dr. Ernlund, have you anything to add in closing this discussion?

DR. CARL H. ERNLUND, Boston: As far as the whispered voice is concerned, I have talked that over with some teachers of elocution and they all seem to agree that there is more effort required on the part of the larynx to produce a forced whisper than there is when speaking in a low tone.

The light that you refer to, Dr. Hawes, is probably the Verba solar light, the one I referred to in my paper.

At the throat clinic of the Massachusetts General Hospital we see very few patients seeking aid for laryngeal symptoms due to tuberculosis. In some of the clinics in Central Europe such as the Hajek Clinic in Vienna, it is a daily occurrence.

CHAIRMAN HAWES: The next paper is "Effect of Bronchitis, Influenza, and Pneumonia upon Pulmonary Tuberculosis." There is no one who is more fitted to speak on this subject than Dr. Frederick T. Lord, of Boston. (Applause.)

THE EFFECT OF BRONCHITIS, INFLUENZA AND PNEUMONIA ON PULMONARY TUBERCULOSIS

BY FREDERICK T. LORD, M.D.*

THIS topic entails a discussion of the influence of bronchitis, influenza and pneumonia on the course and outcome of pulmonary tuberculosis. Their effect cannot be estimated in isolated cases and resort must be made to statistics.

EFFECT OF BRONCHITIS ON PULMONARY TUBERCULOSIS

The history of onset of pulmonary tuberculosis may be considered in this connection. Careful inquiry in a series of patients under my care indicates that about one-half give the history of an acute upper tract infection as an initial manifestation. Such patients have what seems to be an ordinary "cold" with or without sore throat, and this is followed after a few days by cough and expectoration. The cough continues for a longer period than is ordinarily to be expected with a mild infection and in addition there are usually afternoon fever, night sweats and loss of weight.

This is the most common single mode of onset of pulmonary tuberculosis and suggests that such respiratory infections as accompany a "cold" excite a slumbering tuberculous lesion to greater activity.

A similar point of view obtains concerning the relation of coryza or other mild respiratory infection to the onset of lobar pneumonia. The history of such an infection can likewise be obtained in from 25% to 50% of all cases of lobar pneumonia and it is thought that the specific agent of the cold (as yet unknown) serves to implant the pneumococcus in the deeper parts of the respiratory tract and thus acts as an important predisposing cause of the disease. My faith in acute upper tract infection as a predisposing cause of typical lobar pneumonia was, however, shaken by the experience during the last pandemic of influenza. Of 198 cases of pneumonia seen in consultation during the epidemic period only two were typically lobar in character. If upper tract infections are important in the implantation of pneumococci in the lung it is difficult to understand the paucity of typical lobar pneumonia cases during the course of the epidemic. Since my interest in this matter has been aroused I have noted the occasional onset of cough due to malignant disease of the bronchus or lung following an acute coryza.

The point of view that acute respiratory infections excite pulmonary tuberculous lesions to greater activity and predispose to lobar pneumonia may be fallacious in that patients who develop these affections, like those who do not, are subject to the commonly prevalent "cold" and that both would have developed without the influence of such an infection. This objection is hard to meet when we consider the great prevalence of common "colds" throughout the year and especially during the winter. In the absence of further information on this matter it must, I think, be concluded that the acute respiratory infections have as yet been shown to bear only a chance relation with the onset of phthisis.

They may unfavorably influence the course of the disease in consequence of an inflammatory reaction of the mucous membrane of the deeper parts of the respiratory tract and the mechanical effect of cough, but further evidence must be obtained before the matter can be regarded as settled. The effect of influenza on phthisis is, as will be shown later, unfavorable and this lends support to the assumption that acute infections of another kind are likewise unfavorable.

Such acute respiratory infections, as accompany measles, whooping cough, diphtheria and at times scarlet fever are thought to excite pul-

*For record and address of author see "This Week's Issue," page 432.

monary tuberculous lesions to greater activity, but I know of no observations which prove that they do. The investigations of Von Pirquet on the behavior during measles of the skin test with tuberculin is of interest in this connection. He found that during this disease skin tests with tuberculin were temporarily negative. Inasmuch as positive skin tests with tuberculin may be taken to indicate a condition of relative immunity against the tubercle bacillus, it may be that lack of skin sensitiveness to tuberculin during the disease means that the individual is at this time more susceptible to the tubercle bacillus. While this change from allergy to anergy during measles may be of importance, the matter cannot be regarded as settled.

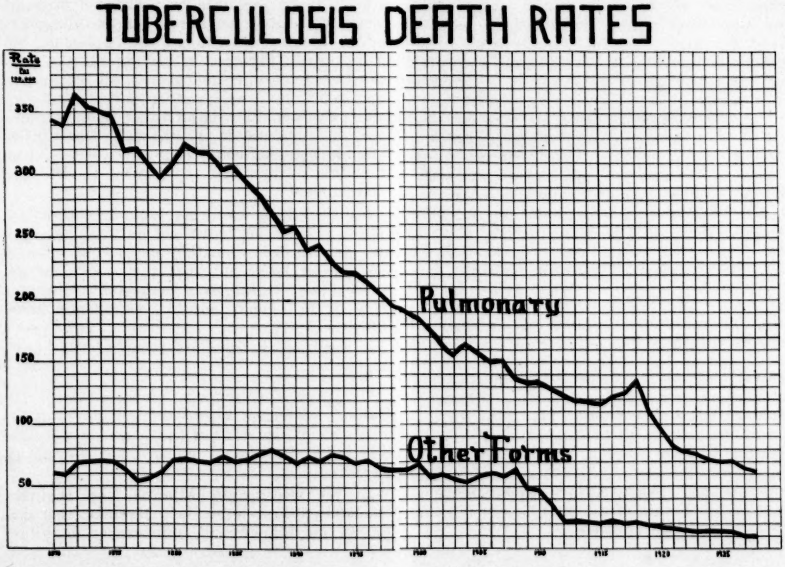
The relation of the chronic non-tuberculous bronchopulmonary infections to tuberculosis is also uncertain. It is, on the whole, striking that patients with pulmonary abscess seldom develop manifest tuberculosis, and in the rare instances in which this has occurred in my experience it has been impossible, in spite of careful investigation, to exclude the possibility that the disease was tuberculous from its inception.

EFFECT OF INFLUENZA ON PULMONARY TUBERCULOSIS

Statistics on the mortality from pulmonary tuberculosis afford some information regarding the influence of pandemic influenza on the outcome of the disease. During the year preceding Sept. 30, 1889, 67 men were discharged on account of phthisis from service in the garrison in Munich, while in the succeeding six months during the influenza epidemic 132 cases of phthisis were discovered. In other words, in half the time about twice the number of cases were found and these figures have the merit that the diagnosis was made by the demonstration of tubercle bacilli in the sputum.

I have gone over the vital statistics for Paris to see what information could be obtained regarding the influence of influenza on tuberculosis and find that in the two weeks from Dec. 22, 1888 to Jan. 4, 1889, 349 patients are recorded as having died from phthisis, while in the same two weeks one year later during the influenza epidemic 886 persons died from phthisis. These figures from Munich and Paris suggest that influenza may excite a slumbering tuberculosis to greater activity and increase the mortality from the disease. Inasmuch as the incidence of influenza pneumonia was low in the pandemic of 1889-90 it is improbable that the superposition of influenza pneumonia on phthisis played any considerable part in the mortality returns from Paris.

The declining mortality from pulmonary tuberculosis in the United States and in England and Wales was interrupted by a period of relative increase in mortality from 1915 to 1918. This may be ascribed to economic depression and other factors incidental to the world war and to the pandemic of influenza during the latter part of this period. The increase in the number of deaths ascribed to pulmonary tuberculosis during 1915 to 1918 is illustrated in the accompanying mortality curve kindly furnished by the Department of Public Health (V. Chart)



giving the annual rate per 100,000 population for the State of Massachusetts. As will be seen from the chart there is a gradual rise in the number of deaths from 1915 to a peak in 1918 when influenza was prevalent. The abrupt rise from the figures for 1917 to those of 1918 may be due to influenza. A less significant increase in the mortality from pulmonary tuberculosis is also seen in the figures for 1890 and 1892 when influenza was prevalent.

While it is possible that influenza pneumonia superimposed on phthisis may have been a source of error in some of the returns for 1918, yet on the whole the unfavorable effect of influenza on pulmonary tuberculosis can hardly be doubted from the data presented.

EFFECT OF PNEUMONIA ON PULMONARY TUBERCULOSIS

In an attempt to answer this question I have reviewed 432 cases of lobar pneumonia from my private records and 1183 similar cases from the Massachusetts General Hospital and can find among them no instances of a combination of active phthisis and intercurrent lobar pneumonia with a favorable course. But the difficulty of making a differential diagnosis between tuberculous and non-tuberculous pneumonia in a patient with phthisis introduces a serious error into the attempt to estimate the effect of pneumococcus pneumonia on pulmonary tuberculosis. The failure to became afebrile at about the seventh day may be the first definite intimation that the condition is not one of pneumococcus pneumonia. If it is the pneumonic form of tuberculosis, the course is usually progressively downward and a fatal termination occurs in about six weeks. The tuberculous exudate may in the course of time in part undergo absorption and in the presence of less extensive involvement the residual process may last for months.

The presumption in these unfavorable cases is always in favor of a tuberculous origin from the beginning, but it is usually impossible to exclude the possibility of an intercurrent ordinary lobar pneumonia and consequent extension of the tuberculous process. If, on the other hand, there is prompt and complete recovery from the intercurrent pneumonia the diagnosis of a non-tuberculous infection is justified.

Dependence largely on the outcome for the diagnosis of the nature of the pneumonia complicating pulmonary tuberculosis seriously interferes with any fair estimate of the effect of pneumonia on pulmonary tuberculosis. An unfavorable course is interpreted as due to tuberculous pneumonia, and a favorable outcome to ordinary lobar pneumonia. The diagnosis does not of necessity need to depend wholly on the outcome, however, because the findings of Type I or II pneumococci in the sputum and by lung puncture and blood culture would serve to establish the nature of the intercurrent infection and help solve the problem.

I am thus unable to make any definite estimate of the influence of ordinary pneumonia on the course and outcome of pulmonary tuberculosis, but I am inclined to believe that it is unfavorable and more unfavorable than influenza.

There are a few instances in my experience of the occurrence of intercurrent ordinary lobar pneumonia in patients with inactive pulmonary tuberculosis with complete recovery and no unfavorable effect upon the tuberculous lesions.

In conclusion I may say that there is considerable difficulty in obtaining evidence regarding the influence of acute respiratory infection on the course and outcome of pulmonary tuberculosis. Acute coryza and other mild respiratory infections are the initial manifestations in a large proportion of patients with phthisis, but occur so frequently in those without this disease as to make their influence doubtful. Influenza appears to be an unfavorable complication. The effect of pneumonia is uncertain. On the whole, however, it seems probable, though not satisfactorily established, that acute respiratory infections tend to excite pulmonary tuberculous lesions to greater activity and hasten the fatal termination.

DISCUSSION

CHAIRMAN HAWES: Dr. Lord's paper is open for discussion.

I feel that it has helped a great deal to have this subject put before us in a perfectly clear way. We are all apt to be a bit stampeded when a patient with chronic tuberculosis comes down with an influenza or perhaps a bronchopneumonia. It is not always easy to diagnose; indeed in many cases it is quite impossible, but in my own experience in looking after a good many cases of chronic tuberculosis in private practice, I have been rather surprised to see how very well the majority of these chronic cases of tuberculosis go through acute infections without suffering a great deal of harm, providing always that the patient is amenable to treatment.

The first thing I tell my patients with tuberculosis is that they must not only get into bed and stay in bed when they get a cold, even of the mildest kind, but that they must not get colds. That is the most important thing for them to do, namely *not* to pick up any acute infection.

Is there any further discussion of Dr. Lord's paper?

DR. HUGH B. CAMPBELL, Norwich, Conn.: Dr. Hawes's statement about not getting colds reminds me of the story of the Irishman who said if he knew where he was going to die he wouldn't go there.

At the meeting in Atlantic City that the Sanatorium Association held recently, this subject of the influence of influenza or of milder

epidemics, like grip, such as we had this year, on tuberculosis, was present for discussion. I think it is hardly fair to compare sanatorium cases with cases outside the sanatoria, especially if you have the opportunity to isolate your cases and restrict visitors, but I think the consensus of opinion there was, as expressed pretty well by Dr. Barnes of Rhode Island, that the sanatorium cases themselves did quite well, in spite of this recent influenza epidemic that we had; in fact, there were hardly any ill effects on the patients, whereas it was a much more serious complication in the members of the staff who had had tuberculosis, because as Dr. Barnes says, you try to keep your staff up as long as possible before putting them to bed.

CHAIRMAN HAWES: Dr. Lord, have you anything further to add? (He had nothing further to add.)

I will declare this meeting adjourned.

The meeting adjourned at four-thirty o'clock.

The following officers were elected to serve for the ensuing year in the Section of Tuberculosis:

Chairman—Dr. Walter A. Griffin, Sharon.

Secretary—Dr. S. H. Remick, Reading.

A REVIEW OF CASES OF PELLAGRA ADMITTED TO THE BOSTON PSYCHOPATHIC HOSPITAL FROM 1922 TO 1928 WITH SPECIAL REFERENCE TO ALCOHOL AS AN ETIOLOGICAL FACTOR

BY R. H. GUTHRIE, M.D.*

THE relation of alcoholism to pellagra has in recent years attracted renewed interest[1]. Since pellagra is rather generally accepted as a deficiency disease, the factors contributing to the origin of pellagrous symptoms offer interesting material for study in the various specialties of medicine.

Early in the 20th century authors were writing of "pseudo-pellagra, alcoholic parapellagra, parapellagra of misery, and parapellagra of the insane"[2]. This terminology has been widely used with the belief that these conditions did not belong to the group forming the clinical picture of pellagra per se. Such an hypothesis is likely to cause us to think of pellagra in terms of a clinical entity rather than to study the reaction of the individual organism to causative agents. The preponderance of evidence leads us to believe that we are dealing in pellagra with a more or less general systemic reaction to dietary deficiency which is contributed to by many environmental and morbid conditions.

The limited number of cases herein reviewed adds little of interest to the clinical picture of pellagra, but they contribute to the material which has led some writers to refer to pellagra as a morbus miseriae. These cases cannot be considered as entirely representative of pellagrins who are admitted to the general hospitals or to the ordinary state hospitals because we deal mainly with acute psychiatric cases or chronic cases in their earlier stages. The syndrome and the etiological factors of a deficiency disease depend somewhat upon the setting in which they arise, and one expects here some variations from the pellagra which has been considered endemic to southern climate. In this group of cases the difficulties of diagnosis were numerous because of the prevalence of complicating factors. However, the diagnosis of pellagra was not made in any case without the presence of skin manifestations which were corroborated by other signs and symptoms. Diarrhea was the symptom most frequently described as appearing first and it was followed by dermatitis, mental symptoms, stomatitis, and neuritis, in the order given. During seven years, from 1922 to 1928 inclusive, there was recorded fourteen cases in the Boston Psychopathic Hospital in whom the primary cause of admission was pellagra.

CASE No. 1. E. R.—Male, age 39. Admitted October 17, 1928. Died November 13, 1928. Diagnosis, psychosis with pellagra. Patient was admitted from the Carney Hospital where he had been under treatment three days. He was excited, confused, and fearful. He had been drinking to excess since the age of sixteen and in recent months had consumed incredible amounts of liquor. For two months he had been losing weight, complaining of pains in his legs, and had shown a lack of interest. He became somewhat sluggish and rather lethargic. One month before admission he developed troublesome diarrhea—10 to 15 movements per day—and an erythema appeared on his hands, wrists, face and neck. Physical examination revealed an undernourished man with exfoliation on the backs of hands and neck, with seborrheic dermatitis on his forehead, bridge of nose and chin, the latter being pigmented. He complained of pain and tenderness in both calves. The pupils reacted sluggishly, there were fine tremors, the reflexes were active, Romberg positive, gait feeble and staggering, and pyorrhea was present. The systolic blood pressure was 155 and diastolic 115. Bronchial râles were present. Vibration sense was diminished below the knees. Mentally he was confused and experienced auditory and visual hallucinations. He was placed on a high caloric diet consisting largely of fresh meat, eggs, milk, beans, and baker's yeast, and was given tonic baths in the hydrotherapeutic department, under which treatment he improved rapidly. He was removed from the hospital against advice on October 26 but was returned on October 28 when the police were called to his home and found the patient and his wife intoxicated. He was returned to the hospital in a delirium from which he never recovered, and died of pneumonia which developed on November 10.

CASE No. 2. L. F. D.—Female, age 38. Admitted February 23, 1927. Died on February 28, 1927. Diagnosis, psychosis with pellagra. She was referred by the Family Welfare Society. In September of 1926 she was diagnosed as having incipient tuberculosis and was in a sanatorium for three weeks. She had four children, the youngest of whom was two years. The family lived in a squalid home and were quite dependent upon charity. There was no definite history of alcoholism. She had severe diarrhea lasting several weeks in December of 1927 and this had never completely subsided. She had no appetite and lost weight. Physical examination revealed that she was underweight forty-eight pounds and there was dermatitis over the dorsum of both hands which had begun to desquamate and show pigmentation and redness. Facial expression was fixed. She was non-co-öperative and had difficulty in swallowing and talking. Her knee kicks were decreased, the Achilles reflexes were absent, and there was a suggestive Babinski on both sides. The superficial abdominal reflexes were absent, gait was slow and staggering, and Romberg was positive. Her heart sounds were distant and temperature 99½ F. Her tongue was reddened and swollen. She was confused at the time of admission and passed into a mumbling delirium, gradually failing until the end.

CASE No. 3. B. C.—Female, age 52. Admitted October 19, 1925 and discharged as improved on

*For record and address of author see "This Week's Issue," page 432.

November 7, 1925. Diagnosis, psychosis with pellagra. The patient had a period of mild depression in 1911 following the death of her daughter. She had apparently been temperate with regard to alcohol. About 1919 she had begun to complain of heat and tenderness in her feet. This persisted until the time of her admission, interfering with her walking. In December of 1924 she spent six months in Florida but became more feeble, lost weight and returned home a bed patient. Her teeth were removed in March, 1925. She had diarrhea beginning in May, 1925. In the early summer of this year she had developed a scaly condition over the dorsum of her hands, forearms and ankles, which became pigmented. She had had two tonic convulsions with unconsciousness lasting about four minutes, and frequently had muscular twitchings of the whole body. Throughout June she had been semi-conscious, and in bed until September when she improved and cleared up mentally. In September, 1925 she became excited, restless, and refused food, in which condition she remained until her admission. Physical examination showed pigmented areas over the face, neck and hands, and desquamation over the dorsum of both hands. The deep tendon reflexes were hyperactive with the exception of the Achilles reflexes which were absent. She soiled involuntarily. There were fibrillary muscular twitchings and atrophy of the interossei muscle. There was foot drop with equinovarus on both sides and some tenderness of the legs. She had a creamy vaginal discharge with marked erythema of the external genitalia. Her blood pressure was 170, systolic, and 100, diastolic. Mentally she was incoherent, resistive, and partially confused. She was given the usual dietary régime and slowly improved both mentally and physically although the weakness of peroneal muscles was present at the time she was discharged.

Case No. 4. J. M.—Female, age 32. Admitted March 18, 1925 and discharged, condition unimproved, March 22, 1925. Diagnosis, psychosis with pellagra. The history indicated that the patient had complained of some vague gastric trouble since 1922 and had restricted her diet. In March 1924 she had a gastro-enterostomy and never completely recuperated from this operation. She had never eaten meat or drunk milk. For one year before her admission she had lived on Graham crackers, soup, boiled vegetables and custards. For three years before admission she had taken an average of one wine glass of brandy daily and had drunk a small amount of wine; however, all alcoholic drugs had been taken in moderation and for medical purposes. For one year she had been taking 10 to 15 grains of sodium bromide at bed time. In July, 1924 she had diarrhea and lost weight. In August and September she noticed redness and roughening over the hands, but this, together with the diarrhea, disappeared in October, 1924. In January, 1925 the skin lesions and diarrhea reappeared and she became depressed mentally and complained of dizziness. Physical examination revealed emaciation, brownish pigmentation of the face, and desquamation over the sacral region, elbows and extensor surfaces of the hands. Her tongue was reddened about the margin. Her pupils were small but reacted normally. Mentally she was poorly oriented, self-accusatory, incoherent at times, and depressed. She exhibited marked memory defects. She gradually became confused and developed a definite delirium. The husband, fearing an exitus, removed her against the advice of physicians and no further record is obtainable.

Case No. 5. L. G. W.—Female, age 43. Admitted April 3, 1924. Died on May 7, 1924. Diagnosis, psychosis with pellagra. The patient had spent six weeks in this hospital in 1917, during which time she was in an acute excitement and from which she apparently recovered. She had never used alcohol excessively. She was said to have made a good adjustment at home until late in 1923. She had always had a capricious appetite, living principally on vegetable salads. She had always carefully excluded meat, fowl, milk and eggs from her diet, and had been a small eater, never taking breakfast. In January of 1924 she began complaining of a tired feeling and developed stomatitis which she thought was cancer. She had severe ulcerations of the throat, tongue and palate and her hands showed an erythema. She was treated in the skin clinic of the Massachusetts General Hospital in February and was admitted to that hospital three days before her transfer to the Boston Psychopathic Hospital. Physical status: She was undernourished and had desquamation with pigmentation of the elbows, wrists and neck. The deep tendon reflexes were active, the gait was ataxic, station unsteady, and there was general muscular weakness with coarse tremors. The skin over her legs was almost anesthetic. Her blood pressure was 160, systolic, and 110, diastolic. There was moderate secondary anemia. She was disoriented, talkative, restless, and incoherent. She showed no improvement and remained restless until she was exhausted. She took very little of the prescribed diet. Her temperature was irregularly elevated until near the end when it reached 103 F. Post mortem examination showed edema of the brain, congestion of the lungs, injection of the intestinal mucosa, chronic vascular nephritis, chronic fibrous endocarditis and peritonitis, chronic perihepatitis, splenitis and pleuritis.

Case No. 6. R. D.—Female, age 36. Admitted May 4, 1924. Died on May 27, 1924. Diagnosis, psychosis with pellagra. She was an Italian woman who had been supported by the city's charitable organizations for some time and who could not speak English. No reliable history was obtained but she is said to have been abstinent with regard to alcohol. Two months before admission she became weak and a symmetrical skin eruption appeared. Physical examination revealed swollen and infected gums and symmetrical dermatitis affecting the wrists and elbows. The pupils were irregular and reacted sluggishly to light, the tongue was dry and reddened and there was profuse leucorrhea. She complained of general weakness and gave a history of staggering or falling spells. She was co-operative but had no appetite and took very little nourishment. Severe diarrhea began soon after admission and on May 14 she became confused mentally, and began to fail physically. She passed into a semi-stuporous condition from which she never rallied. Post mortem examination showed acute enterocolitis with ulceration of the lower bowel, Meckel's diverticulum, moderate arteriosclerosis, cholelithiasis, and chronic leptomeningitis.

Case No. 7. P. G.—Male, age 48. Admitted January 12, 1924. Died on January 21, 1924. Diagnosis, psychosis with pellagra. He had been a successful physician who was in active service overseas during the world war. During this time he was gassed four times and had influenza and "trench fever". He was never in robust health after the war and became profoundly alcoholic. After August, 1923 he was unable to attend to his profession because of general weakness and pains in his legs, back and head, and troublesome diarrhea. In October, 1923 he spent one month in the Peter Bent Brigham Hospital where the diagnosis of pellagra was made. He went to the Chelsea Naval Hospital in November, 1923 where he remained until he became uncontrollable and was sent to this hospital. Physical exam

ination showed a bedridden, undernourished, incontinent man with temperature of 100 F. There were ulcerations over bony prominences and the skin of his hands was dry and desquamating. The pupils were irregular and reacted poorly to light and accommodation; his tendon reflexes were hyperactive and there were generalized coarse tremors, with atrophy of the lower extremities. His blood pressure was 104, systolic, and 68, diastolic. The red cell count was 3,648,000, and gastric analysis revealed anacidity. He was confused, untidy and noisy at times. His bowels moved six to twelve times per day. He never co-öperated, but passed into a feeble delirium, and developed pneumonia from which he died. Autopsy revealed bronchopneumonia, axillary and inguinal lymphadenitis, sclerosis of the coronary arteries and aorta, chronic interstitial nephritis, chronic colitis and decubitus ulcers.

CASE No. 8. H. C.—Female, age 33. Admitted October 11, 1924. Died October 13, 1924. Diagnosis, psychosis with pellagra. The patient had been drinking heavily for several months, or possibly years, and had been using morphine for one year before admission. She quit eating, and began experiencing auditory and visual hallucinations. Three weeks before admission she suddenly ceased drinking. For two weeks she had been confined to her bed in a state of muttering delirium. She had lost weight rapidly. Physical examination showed an emaciated, bedridden and stuporous woman. Skin was dry and scaly over the entire body. There was desquamation over the nose, feet, and dorsum of the hands. Her pupils reacted sluggishly, the right knee kick was more active than the left, the plantar reflexes were absent and there was a suggestive Kernig. She presented fine tremors, her throat was dry and inflamed, and her tongue was furrowed, red and beefy in appearance. Her systolic blood pressure was 100 and diastolic, 80. There was low irregular fever. She soiled frequently, remained in a stuporous delirium, would take only liquids, and gradually failed. Autopsy revealed a circumscribed area of thick pus under the dura in the right hemisphere at the vertex. This was interpreted as a small abscess. Other findings were colitis, gastritis, congestion of the lungs and pleuritis. Microscopic examination of sections from the central nervous system showed an extensive perivascular exudation in the pons, medulla and cord.

CASE No. 9. J. C.—Male, age 36. Admitted July 17, 1924 and discharged as improved January 20, 1925. Diagnosis, psychosis with pellagra. He had been drinking heavily for four years and had drunk a quart per day for some time. His appetite had been poor for three years. In June, 1924 he developed dermatitis on the backs of his hands and diarrhea. He was in a local general hospital two weeks but became confused mentally and was transferred to the psychopathic hospital in a noisy delirium. Physical examination showed an undernourished, weak man who was non-co-öperative most of the time. There was a symmetrical erythema on the dorsum of his hands, and diarrhea was present. His knee jerks and Achilles reflexes could not be elicited. The optic discs were pale and the visual fields were concentrically contracted, indicating optic atrophy. He was confused mentally and became drowsy after admission. He was placed on a high caloric diet and slowly improved. He complained of burning sensation over his feet and hands and at times reacted to visual hallucinations. The skin manifestations and diarrhea gradually subsided but he remained dull and drowsy at times for four months. In December, 1924 he had severe infection of the throat which retarded his recovery. His family was advised regarding the necessary diet and he was discharged from the hospital after his mental and physical symptoms had apparently subsided.

CASE No. 10. B. R. A.—Female, age 29. Admitted February 18, 1923. Transferred to the Boston State Hospital on May 15, 1923. Diagnosis, psychosis with pellagra. For three months before her admission she had been losing weight. Her husband had taken her to a physician because she did not eat enough. She had always been a light eater, never eating meats and living chiefly on macaroni, soups, milk and eggs. When admitted she was undernourished, her pupils reacted sluggishly, but she was too resistive for a satisfactory examination. The onset of the psychosis had been rather sudden, occurring about ten days before admission. She had been excited, growing worse until she could not be controlled at home. She was very restless, incoherent and misidentified people. She would take very little nourishment in the hospital. About twenty days after admission she developed a symmetrical dermatitis over the dorsum of the hands and these areas later became pigmented. She had been untidy and developed definite diarrhea. She became exhausted, passed through delirium into stupor, and force feeding was resorted to. Early in April she became more co-öperative and began to improve. She began to take nourishment more liberally and the diarrhea and skin manifestations subsided. The diagnosis made during the early period of her hospital residence was dementia praecox but the physical symptoms which developed justified a diagnosis of pellagra. At the state hospital she never completely recovered her strength and a few weeks after her transfer she again developed diarrhea and slowly failed. She died on November 30, 1923.

CASE No. 11. M. A.—Female, age 47. Admitted July 12, 1923. Discharged on July 13, 1923, condition improved. Diagnosis, psychosis with pellagra. The patient came from the Peter Bent Brigham hospital where she had been under treatment one week. There she was suspicious and excited. A tentative diagnosis of pellagra had been made. She was in the Psychopathic Hospital less than one day and no complete anamnesis was obtained. The papers which accompanied her to the hospital stated that she had been a user of alcohol but had quit this habit four years before admission. The family was thought to be in straitened financial circumstances. She had had stomatitis, and dermatitis on her hands for two months. Physical examination revealed a desquamating dermatitis on the feet, extensor surfaces of the hands, and on the face. Her pupils reacted sluggishly to light, her knee kicks were hyperactive and the Achilles reflexes were not elicited. She had coarse tremors, red dry tongue and a suggestion of a Babinski on both sides. She was poorly oriented, irritable and dull mentally. She was non-co-öperative and was slightly fearful. The husband was not co-öperative and removed her before a thorough study could be made.

CASE No. 12. E. E. S.—Male, age 56. Admitted October 30, 1923. Died November 9, 1923. Diagnosis, psychosis with pellagra. The patient's mother committed suicide at the age of forty years and had spent some time in a state hospital. The patient was always ambitionless and had very little interest in life. No one knew much of his intimate life and habits. Early in 1921 he was in the Massachusetts General Hospital two weeks with an infection of the throat but recovered. Six months later in the same year he had a confused period and spent three weeks at a local hospital where he was diagnosed arteriosclerosis. He recovered but continued to have brief periods of confusion and showed some memory defect. Physical examination showed a poorly nour-

ished man with beefy red tongue, and scaling and pigmentation of the extensor surfaces of the hands. There were slight tremors of the hands and some evidence of sclerosis of the superficial vessels, with a blood pressure of 165 systolic, and 115, diastolic. His orientation was impaired, his memory was very poor and his grasp of general information was inadequate. He showed a mild degree of confusion and developed pneumonia with which he made a rapid exitus. Post mortem examination of the brain revealed a small cystic softening of the right side of the cerebellum. There was also bronchopneumonia, subdural cerebral hemorrhage, chronic fibrous endocarditis, sclerosis of the aorta, slight cardiac hypertrophy, perisplenitis, excessive colon and hypertrophy of the prostate.

CASE No. 13. E. M.—Male, age 38. Admitted November 7, 1923. Discharged as improved on May 10, 1924. Diagnosis, psychosis with pellagra. The history stated that the patient had been a heavy drinker since youth, and the papers which accompanied him to the hospital stated that he was an addict to alcohol. He began to have diarrhea in August, 1922 and complained of dizziness and nausea. He admitted over-indulgence in alcohol at this time but claimed that he had a fair appetite and took a varied diet. About September, 1922 he noticed some swelling of the hands and face, with a symmetrical erythema which later desquamated. Physical examination showed a rough dry exfoliation of the backs of the hands, the maleoli, soles of the feet, elbows and tibiae. His pupils reacted sluggishly and the left Achilles was absent. The other tendon reflexes were normal. He had been confined to the Boston City Hospital for twenty days prior to his admission here and the skin manifestations had improved a great deal. When admitted to the Psychopathic Hospital he was experiencing visual hallucinations, was irritable and showed impairment of memory, but he cleared up gradually and made an uneventful recovery.

CASE No. 14. G. A.—Female, age 43. Admitted October 3, 1922. Diagnosis, psychosis with pellagra. Patient was transferred from the Massachusetts General Hospital where she had been confined about forty days and where a diagnosis of pellagra with Korsakoff's syndrome was made. She had drunk steadily for many years but more excessively in recent years. She had had diarrhea and skin manifestations of pellagra which cleared up in a few weeks at the Massachusetts General Hospital, but she began to experience hallucinations and became excited, which made it necessary to send her to the Psychopathic Hospital. Her mental condition improved slowly and she was dismissed on visit to relatives January 4, 1923. She returned to the hospital on January 12, 1925 because of drug addiction. She had had several severe attacks of diarrhea and had become habituated to paregoric. Her skin was dry and desquamating over extensor surfaces of the hands and elbows. She was undernourished and her tongue was reddened. She had been experiencing auditory hallucinations. With the usual dietary treatment she improved and was again dismissed on March 11, 1925. She was returned on July 11, 1925 in an exhausted condition. She had had a serious diarrhea but cleared up rapidly under dietary treatment. She was dismissed on September 11, 1925 and admitted for the fourth time on July 4, 1926 in an undernourished condition, with diarrhea and lesions characteristic of pellagra. In two months at the hospital she gained twenty-five pounds and left on September 12, 1926 in good condition. We have had no further contact with her.

These cases present an interesting variety of etiological factors, most important of which is alcoholism. Six out of the fourteen cases were profound alcoholics. Their overindulgence in alcohol was sufficiently marked to be an outstanding feature of the history. Of the total fourteen cases, nine were females, which factor, no doubt, kept the percentage of alcoholics from being much higher. Three cases gave a history of using other drugs. One alcoholic was addicted to the use of morphine. Another alcoholic was addicted to the use of paregoric and a patient who had suffered of gastric ulcer had been using bromides for one year. Economic stress was evident in three of the non-alcoholic cases and dietary caprices were described in three others. Of the three latter cases, one woman had been a strict vegetarian, living chiefly on vegetable salads. This same patient had had one acute manic attack six years prior to the onset of pellagrous symptoms. Another female of this group had, on account of symptoms of a peptic ulcer, which had been present four years before the pellagrous symptoms appeared, restricted her diet to crackers, soup, boiled vegetables, and custards. She had had a gastroenterostomy performed five months before the onset of diarrhea. The third female who gave a history of dietary caprices had always been a light eater, carefully excluding meat from her diet and living mainly on macaroni, soups, milk, and eggs. She had, for some time, made vague somatic complaints of psychoneurotic origin. A female, (Case No. 2) in whose history alcoholism does not enter, had been in a sanatorium for tuberculosis for a brief period three months before the onset of her pellagrous symptoms. She lived in a squalid home and was overburdened with children. There were two other cases (Nos. 6 and 11) in which straitened financial circumstances were evident but the history in each case was incomplete. A male, who was considered temperate, had definite signs of arteriosclerosis. The history in Case No. 3 is uneventful with the exception of a mild period of depression four years prior to the onset of pellagra.

The relation of economic stress to pellagra, although speculative, has long been recognized[3]. Straitened financial circumstances do not, however, limit the variety of one's diet in metropolitan districts as it does in certain remote rural districts because here a monotonous diet may be unavoidable.

The age incidence in these cases ranged from twenty-nine years to fifty-two years, the average being thirty-eight years. The cases were admitted during every season of the year, but with a decided preference for October[4].

The death rate of eight out of fourteen (57%), indicates that we were dealing with a very malignant disorder, and the case records include the terms, "muttering delirium" and "feeble delirium" with noticeable frequency[5]. The combination of alcoholism and pellagra has long been considered very serious and the high mor-

tality may be explained by the prevalence of central nervous system involvement. Of the six cases complicated with alcoholism, three died after brief illnesses. In four cases the Achilles reflexes were described as absent where the knee kicks were described either as present or hyperactive, which substantiates the claim that the sciatic nerve is the site of predilection for certain toxins. Involvement of the sciatic nerve affects the Achilles reflex but not the knee jerk for the latter is accomplished through the anterior crural nerve. Of the total number of patients only five improved or recovered while under our care, and these were sufficiently cooperative to take nourishment as prescribed[6]. Some of the first cases were treated by high caloric diet without any further specification and favorable results were obtained in most co-operative cases. It is of interest to note here that liver, salmon and egg yolk have more recently been recognized as the most potent pellagra preventive foodstuffs[7].

I have reviewed six cases of alcoholic psychoses in which mention was made of symptoms of dietary deficiency. These cases were selected from recent admissions and illustrate the common symptoms of dietary deficiency which are encountered in chronic alcoholics. It is impossible to determine the percentage of patients admitted with an alcoholic psychosis who had symptoms of pellagra, but it has not been an infrequent observation.

With regard etiological factors, the following suggest themselves:

Case No.	Alcoholism	Economic Status	Previous Diseases	Previous Psychoses	Other Factors
1	Positive	Marginal			
2		Straitened	Incipient T. B.		
3				Mild depression four years previous	
4	Moderate		Peptic ulcer and gastro enterostomy		Took bromides and had capricious appetite
5				One manic attack seven years previous	Capricious appetite
6		On charity			
7	Positive		Gassed, influenza and "trench fever"	War neurosis	
8	Positive				Used morphine
9	Positive				
10				Psychoneurotic	Capricious appetite
11	Intemp. 4 years previous	Straitened			
12			Arteriosclerosis		Seclusive and peculiar personality
13	Positive				
14	Positive				Paregoric addict

Case No. 1. M. M.—Male, age 31. Admitted November 5, 1924, and transferred to a State Hospital on November 20, 1924, condition improved. Diagnosis, alcoholic psychosis, chronic delirium, plus pellagra. The patient was gassed and wounded in the world war and had been an invalid since his return from overseas. He stayed at home and drank excessively. In 1922 he spent two months in a general hospital for alcoholic gastritis and neuritis. He continued to drink and was sent to the Chelsea Naval Hospital in 1923 with an acute delirium associated with pellagrous symptoms. Again he returned home and began drinking, using one pint or more daily. He had been in bed two weeks before his admission to the Boston Psychopathic Hospital, and gave a history of diarrhea, vomiting, and dermatitis on the extensor surfaces of his hands. He became confused, violent, and excited before admission. Physical examination showed emaciation and healing dermatitis over both hands. His station was unsteady, there was a suggestion of a Babinski on both sides, there were coarse tremors, active tendon reflexes, and diarrhea. He was overactive, excited, confused, and experienced auditory and visual hallucinations. He took a liberal amount of nourishment, the skin symptoms improved, diarrhea subsided, and there were lucid intervals alternating with periods of confusion and irritability. Within fifteen days he improved sufficiently to be transferred to a convalescent hospital.

Case No. 2. A. P.—Male, age 44. Admitted September 22, 1928. Discharged as recovered on October 1, 1928. Diagnosis, alcoholic psychosis, type undetermined. He was brought to the hospital in an ambulance, coming from the Boston City Hospital where he had been treated twenty-six days. He had developed visual hallucinations and had become excited. He had drunk excessively for nineteen years and had been consuming one pint to one quart daily for some time. Two months before admission he became sleepless, depressed, apprehensive, and suspicious. At this time his appetite failed and diarrhea set in. He was confined to the bed at home for a few weeks before going to the City Hospital. He

had been considered a Korsakoff's Psychosis by the neurologist and a consultant had preferred the diagnosis of pellagra. In the City Hospital he had diarrhea, and dermatitis on the extensor surfaces of the hands and wrists. Physical examination on admission revealed: desquamation, and pigmentation of the dorsum of hands; headache; tingling and numbness of hands and legs; normal pupils; marked tremors; hyperactive tendon reflexes, poor control of sphincters; staggering gait; unsteady station; slurring speech; normal vibration sense; and pyorrhea. He experienced auditory and visual hallucinations and was somewhat confused. He cleared up rapidly and was entirely co-öperative after four days. He received special dietary treatment and hydrotherapy, which were apparently effective and he was discharged after ten days in the hospital.

Case No. 3. F. S.—Male, age 37. Admitted August 18, 1928, and discharged as recovered on November 9, 1928. Diagnosis, Korsakoff's Psychosis. He had been in the Chelsea Naval Hospital one and a half months and had developed delirium with marked tremors. The diagnosis accompanying the patient to our hospital was Korsakoff's Psychosis. Glossitis and stomatitis, and dermatitis of the extensor surfaces of the hands, and dermatitis of the face were described. He had drunk excessively for five years and had been taking a quart of whiskey per day prior to his hospitalization. He had spent a month in a hospital in 1927 because of pain in his legs, parathesias and crawling sensations. His appetite failed him in June 1928 and he took veronal for insomnia until admitted to the Chelsea Naval Hospital, at which time he appeared deeply drugged. The admission physical examination revealed a very weak, tremulous and undernourished man. He presented pigmentation and dryness of the hands and wrists and a dry dermatitis on the forehead and bridge of nose. He was non-co-öperative, incontinent, and there was pain on deep pressure over the calves. He presented a speech defect, marked ataxia and absent knee kicks. He was in a feeble delirium for eight days after admission but on a diet specifying fresh meat, milk, eggs and yeast, he gradually improved. Hydrotherapy and massage were later added to the treatment. The recovery was slow but apparently complete.

Case No. 4. F. H. C.—Male, age 46. Admitted June 21, 1928. Died June 28, 1928. Diagnosis, Korsakoff's Psychosis. He was brought to us from the Peter Bent Brigham Hospital where he had been a patient since May 1. He had been a heavy drinker for ten years and in more recent years had been taking a pint to a quart of whiskey daily. He had been in another local hospital for neuritis two years previously. He had complained of pain and numbness in the lower extremities for two years. Two months before admission he ceased drinking and complained of anorexia, malaise, and slight fever. He had had persistent and severe diarrhea for several months before coming to us. Physical examination revealed an undernourished man with expressionless face, small, irregular and unequal pupils, hyperactive knee kicks, monotonous speech, hyperasthesia of lower extremities, deep tenderness over the soles of his feet and troublesome hemorrhoids. He exhibited coarse tremors and twitchings, dry and reddened tongue and reddened buccal mucosa. His skin was dry, loose and inelastic. Skin over his knuckles and elbows was reddened and his extremities appeared cyanotic. Gastric analysis showed anacidity. The total red count was 3,570,000 and the white count was 11,500. His spinal fluid was negative. He was experiencing auditory and visual hallucinations and was confabulating. He was not co-öperative and was fed from a spoon. His diarrhea improved but he gradually failed, passing through a feeble muttering delirium to death.

Case No. 5. P. S.—Male, age 54. Admitted June 25, 1927. Discharged, condition improved, on June 30, 1927. Diagnosis, alcoholic psychosis, paranoid type. There was a history of overindulgence in alcohol for thirty years. He had drunk daily for eight months and began accusing his wife of infidelity. His appetite had been failing for several months and the wife stated that he had "eaten practically nothing" for several weeks. Physical examination showed a poorly nourished man with roughening of the skin over bridge of nose and chin. The pupillary reaction was sluggish, the tongue deviated to the left, there were coarse tremors, coated and furrowed tongue, grossly infected gums and poor oral hygiene. His blood pressure was systolic 200, diastolic 120, and there was moderate albuminuria. His blood and spinal fluid were negative. He co-öperated, improved on a house diet of which he partook freely, and developed considerable insight before he was discharged five days after admission.

Case No. 6. P. N. S.—Male, age 30. Admitted February 3, 1927. Died February 28, 1927. Diagnosis, Korsakoff's Psychosis. He came to us from the Massachusetts General Hospital where he had been treated for alcoholism and diarrhea. He had used alcohol excessively since the age of sixteen, more especially during the last three years. He frequently consumed one quart daily. He had had repeated attacks of delirium tremens. The informant stated that the patient had "eaten practically nothing" in recent months but had been drinking heavily. During November, 1926, he had severe diarrhea, which lasted three or four weeks. Physical examination revealed an undernourished, non-co-öperative man with slight speech defect, tendency to wrist-drop, and irregular and sluggish pupils. His extremities were cyanosed and skin over his knuckles and other bony prominences was reddened. He exhibited some fears, was confused, resistive, and described scorpions biting his legs. He had a daily rise in temperature, generally reaching about 100 F. On the day of his death it rose to 105 F. Diarrhea was present at the time of admission but improved under a liberal diet. His blood and spinal fluid were negative; the white count indicated some infection; and there was no renal impairment. He gradually passed through a low delirium to exitus.

Diarrhea and neuritis were prevalent in the cases diagnosed Alcoholic Psychosis, and the first two cases reported presented quite definite pellagrous symptoms, although alcoholism was given precedence statistically. These alcoholic cases who have symptoms of dietary deficiency generally improve rapidly if they survive the systemic effects of long overindulgence in alcohol. One might consider these as abortive cases of pellagra and the writer is inclined to look upon them as differing only in degree from the pellagrins reported in the first part of this paper. Where the nutrition and metabolism are so markedly affected as in Korsakoff's Psychosis, deficiency symptoms are generally, if not always, present. Of these six cases of alcoholic psychosis, all presented gross tremors and four presented evidence of neuritis. In each case reported, mention was made of some skin manifestation which, together with other symptoms, led the staff to consider pellagra as a possible factor.

It is common knowledge that people who take enormous quantities of alcohol over long periods lose their appetite[8], and, looking through the

records of a number of alcoholics, one frequently sees the expression, "he ate practically nothing", or, "he lived on his liquor". It is also known that alcohol may seriously influence absorption and assimilation[9]. Whether the pellagrous symptoms in chronic alcoholics are due to malabsorption, or to decrease in the total intake of vitamines, or to both, is an interesting problem. The gastric secretions are influenced quite similarly in chronic alcoholism and pellagra, i.e., the secretion of hydrochloric acid is diminished or absent. This fact has been emphasized by those who believe pellagra to be an infectious disease because, they claim, the alimentary tract has lost its natural protection against invasion by pathogenic micro-organisms. The loss of appetite with decrease in the total intake of food in chronic alcoholics is a more simple and logical explanation for the cause of pellagrous symptoms which are not infrequently associated with chronic alcoholism[10].

Other factors may be of importance in the association of alcoholism and pellagra. Misery itself is likely to be increased with the development of the alcoholic habit because the subject buys drinks instead of food with whatever income he may have. The alcoholic patient of ample means may voluntarily curtail his diet after excessive drinking, but the poor patient impoverishes, not only himself, but his family by misappropriating all available funds. However, the alcoholic cases herein reviewed presented, on the whole, no striking evidences of poverty.

SUMMARY

Fourteen cases of pellagra admitted to the Boston Psychopathic Hospital during seven years ending with 1928 were reviewed. Six cases diagnosed alcoholic psychosis were selected from recent admissions and reviewed for comparison with the group of pellagrins.

Of the fourteen cases of pellagra, six were profoundly alcoholic; three gave a history of dietary caprices; three were known to have lived under economic stress; one man in advanced years had arteriosclerosis; and one woman gave an uneventful life history except for a period of mild depression four years prior to the onset of pellagra.

Eight of the fourteen cases died and only five improved or recovered while under our care. This high death rate might have been due to mental complications which greatly hindered therapeutic measures. All fourteen cases showed signs of central nervous system involvement.

Six cases diagnosed alcoholic psychosis showed signs of dietary deficiency differing only in degree from the group of fourteen pellagrins.

Alcoholic pseudo-pellagra is an anachronism. The syndrome of pellagra need not necessarily be a specific reaction to a specific etiological agent, but it may indicate a more or less general systemic reaction to a number of factors which have influenced the diet and habits of the individual.

After taking incredible quantities of alcohol over a long period of time people generally lose their appetite and frequently cease taking any appreciable quantity of food. This may explain the deficiency symptoms which arise in the course of many cases of chronic alcoholism, although the influence of alcohol upon digestion, absorption, and metabolism, merits further investigation.

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AVITAMINOTIC DEPRESSIONS*

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INTRODUCTION: Human behavior can be considered from three angles: (1) psychogenetic, (2) behavioristic, and (3) somatogenetic. I would call your attention to a possible somato-genetic factor in the development of manic-depressive psychosis that has had little study. In reviewing the literature of the past ten years, I have been able to find but three references in which vitamin deficiency and mental disease are considered. In one, an English writer, W. R. Thomas,[1] suggests that avitaminosis may be a factor in producing dementia praecox. In another, Dr. George C. Shattuck, of Boston,[2] suggests that Korsakoff's syndrome may be a type of beriberi due to malnutrition secondary to prolonged alcoholism. The mental symptoms of pellagra are familiar.[3]

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†For record and address of author see "This Week's Issue," page 432.

This paper is frankly a clinical rather than a laboratory one. It records clinical observations and suggests deductions that are theoretical only, not proven. The suggested deductions are not at this time provable because the factors involved—the vitamines—have not yet been isolated in the laboratory. Yet, although the laboratory has not yet isolated vitamin B, the clinician, by assuming that there is such a substance, and that such a substance is present in certain foods and absent in other foods, has gone ahead and has shown on a therapeutic basis how to control beriberi, that type of polyneuritis widespread among rice-eating peoples.

In the hope of stimulating clinical observations upon the possible inter-relation between malnutrition and certain types of depression, this paper is presented.

The sine qua non of a depression is a disturbance of affect, an upset of the individual's feeling of well-being. Careful examination of the personality of the patient, his environment and past experience, whether done with or without elaborate psycho-analysis, may, and often does, explain why the symptoms assume the pattern which they do, but does not disclose the etiological cause. The precipitating factors are probably multiple. Some of them are as follows:

1. The onset of physical disease, such as cancer, myocarditis, nephritis and arteriosclerosis. The patient may well be conscious of the onset of some malignant condition some months before frank clinical symptoms are noted. As we know, many non-recovering depressions develop these diseases. The prognosis in depressions complicated with such intercurrent disease is naturally poorer than in uncomplicated cases.

2. As a sequel of physical depletion after child-birth, after prolonged nursing, after surgical operations, and after infections.

3. Environmental strain and fatigue, particularly if of long duration.

In addition to the precipitating factors here mentioned, there presumably exists another element, which may be a congenital predisposition (words which hide our ignorance), glandular mal-functioning (about which we know little), or an acquired predisposition due to malnutrition, as is so well illustrated in the motor and sensory field in beriberi. This additional element, perhaps, explains the seeming immunity to depression of certain individuals.

Malnutrition may be assumed if an individual has lost or is losing weight, and is eating too limited a quantity and variety of food. This situation exists with most depressed cases, and the cases I have studied may be grouped as follows.

Some patients, seemingly, are chronically somewhat poorly nourished, with an acute exacerbation with their depression. These are the gastro-intestinal variants with ptoses and long histories of the use of diets and laxatives, etc. Others are faddists, who have attempted to live on limited diets, or who, under the dictates of fashion, insist on being more than slender, regardless of physical type. Still others are malnourished subsequent to such surgical procedures as complete removal of the teeth or gall-bladder, or because they suffer from gastro-intestinal disease, which may or may not have entailed an operation. Then there are the patients depleted by the strain of child-bearing, or by nursing, by prolonged alcoholism, or by tedious infections. Finally, there is a group of secondary malnutritional cases; those that have failed to take sufficient nourishment under the drive of emotional stress, or because of lack of appetite as a result of depression, and those who develop phobias about eating and about being poisoned. Many of these patients, on careful study, give evidence of malnutrition ante-dating the onset of mental symptoms, although the malnutrition has only become the dominant factor demanding treatment after the appearance of mental symptoms.

Twenty years ago, those of us who had a chance to work in the Far East were obtaining inadequate but rather similar histories from the cases of beriberi that we saw in the hospitals in China, Japan, or the Philippines. In the eighth edition of Monson's "Tropical Diseases" appears the following statement relative to beriberi:

> "Given the necessary food restrictions, any lowering of the general resistance of the body may lead to the rapid development of this disease. Thus it often makes its appearance during pregnancy, lactation, after surgical operations, or during convalescence from infectious and debilitating diseases such as dysentery, malaria, and enteric."

How aptly this statement suggests a similar situation with regard to some of our depressions! The multiplicity of the seemingly provocative factors of beriberi and its varying wet, dry, and mixed forms befogged the picture, but thanks to experiments in penal institutions and on other segregated groups of natives, the malnutritional factor in the occurrence of beriberi is firmly established.

In the manic depressive psychoses, we also have a multiplicity of seemingly provocative factors. We have manic, depressed, and mixed forms. Early simple cases of beriberi get well with proper diet. Simple cases of depression get well with rest and improved nutrition. Advanced cases of beriberi with paralysis are slow and stubborn, and may not recover in spite of proper diet. Depressions with intellectual involvement that improve in nutrition without improvement in mental symptoms are recognized as having less chance of recovery than simple cases.

There is evidence that manic depressive dis-

ease is less common on the farm than in the city. For example, the first admission rate for New York State for the years 1915-1920 shows the number of urban environment to be more than ten times those of rural environment[4]. Is this due to less emotional strain in the country environment, or to a more meager supply of vitamines in the urban diet? In Finland the peak of depressions comes in the spring, just before the advent of fresh vegetables[5]. The seasonal curve of suicide closely follows this depression curve. In the southern hemisphere this seasonal suicide curve is reversed[6]. Why should the Englishman in London choose one season of the year and the Englishman in Australia another season to supply evidence of his depression? Is this emotional strain greater at a certain season of the year, or is a diet containing an abundance of vitamines of assistance in fending off depression?

Such speculation can be answered only by the continued accumulation of data gathered by many observers. Stimulated, however, by meager, perhaps futile observations, I have made a beginning in studying my cases from the angle of possible vitamin depletion, and I have started treating my patients on a diet supplemented with tablets containing an adequate supply of vitamines of vegetable origin in potent form. Only a beginning has been made. The results are interesting and encouraging, but too few to justify any conclusions. Some of the patients have improved more rapidly in feeling tone and in gain of weight than under ordinary dietetic care.

At present nothing more than speculation is justifiable, except the continued gathering of observations on the possible inter-relationship between malnutrition and depressions, and the possibility of hastening recovery from such depressions by supplying a diet adequate in every way.

The importance of combating malnutrition in depressions is stated in every textbook. It behooves us, as clinicians, to be familiar with the consequences of vitamin depletion. It is already recognized in beriberi and pellagra, and may well be a factor in certain cases of mental disease. Inasmuch as mental diseases are "disorders of behavior at a social or conscious level[7]," we cannot expect to discover any one etiological cause for any one type of mental disease, but we can study precipitating factors and the conditioning elements that allow such precipitating factors to become effective.

Somewhere, perhaps in "The Autocrat of the Breakfast Table," Dr. Oliver Wendell Holmes remarks: "The art of living consists in drawing correct conclusions from insufficient data." Our dietary data are frankly insufficient, but adequate for a working hypothesis, although not yet justifying a conclusion.

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ALKAPTONURIA

BY ELMER S. BAGNALL, M.D.*

ALKAPTONURIA is one of a group of inborn errors of metabolism, included with which are cystinuria, pentosuria and albinism. In alkaptonuria, homogentisic acid, a normal intermediate product of metabolism, becomes excreted in the urine because of the inability of the body to split open the benzine ring which it contains. Two of the amino-acids of protein (tyrosin and phenylalanin) are the mother substances of homogentisic acid.

The alkaptonuric patient can use tyrosin and phenylalanin for synthesis of his own body protein, but in catabolism (both exogenous and endogenous) the process is interrupted. It has been suggested that the condition is a quantitative deficiency of tyrosinase, a tissue ferment. Even a normal person may excrete homogentisic acid if too much l-tyrosin is ingested. Abderhalden found it after fifty grams were taken. There is a strong family tendency; Garrod reports eleven cases in four families. An important fact to note is that the homogentisic acid which is excreted in the urine reduces Fehling's and Benedict's solutions.

Alkaptonuria was first described by Bodeker in 1861, who gave its name because of the strong affinity of the homogentisic acid for alkalies, the urine turning black when an alkali is added. The disease is most commonly reported from Germany. Of the approximately one hundred and twenty-one cases in the literature, only sixteen occurred in the United States, the present case being the seventeenth. The last three cases were reported by G. H. Anderson in 1922.

Symptoms. There are often no symptoms unless there be staining of the underclothing, either red or black (red prior to alkalination or aeration). Sometimes the disease is discovered incidental to insurance examinations. One of Osler's two cases was treated by four prominent European physicians for glycosuria. The alkaptonuria may be intermittent, so absence of spontaneous darkening of urine does not necessarily exclude the diagnosis.

*For record and address of author see "This Week's Issue," page 432.

There are differing opinions as to whether the diathesis materially reduces life expectancy. Often in later life, ochronosis (a blue-black pigmentation of the cartilage) develops. This may involve the thorax, larynx, bronchi, nose and ears, as well as the intima of the arteries. It is in some cases visible in life in the ears and nose; sometimes also brownish discoloration of the sclera occurs. It is in these cases where joint cartilage is involved that more or less severe osteo-arthritis sometimes develops. This appears to be about the only disability that results from alkaptonuria. Because of it, the need of keeping the protein intake down to minimum demands, thereby lessening the available source of homogentisic acid, would seem worth while.

The urine when freshly passed, if acid, looks normal. If allowed to stand unexposed to air, no change takes place. If exposed to air, it turns pink, exactly as if it contained laked blood; then it darkens to black. These changes develop from the top down. If an alkali is added to the fresh urine, it immediately changes to inky black. If dilute ferric chloride is added drop by drop, a green-blue color results which disappears immediately until more drops are added. Nylander's solution is not reduced. It does not react to the fermentation test, nor does it rotate polarized light. It alone reduces silver lactate solution (Folin and Wu) in cold.

It seems likely that there are many more cases of alkaptonuria than the small number reported in the literature would indicate. The case reported by Colonel Ashburn shows how liable this disease is to be overlooked even in people who, like soldiers, are subjected to a more or less careful medical examination. This particular patient had been nine years in military service. He had never noted that the urine stained his clothing. He was twenty-nine years old at the time of reporting at a general hospital in San Francisco and at that time complained only of joint pains. He was sent there with a diagnosis of nephritis, there being albumin and casts present. This case progressed to a fatal termination and was autopsied without any findings which contributed anything new to the subject. The nephritis may have been independent of the alkaptonuria.

CASE REPORT: The patient is a child four years old. There are no other cases of the disease in the family; no consanguinity in the parents. I was first consulted by the mother when the child was about three weeks old. The baby was born in a hospital in another city. There was no evidence of any abnormalities that attracted the attention of the nurses or other attendants. The mother consulted me because she thought there was blood on the napkin. When the napkin stood in water, the water looked exactly as if it contained blood. When the napkins were boiled with soap, they stained black. The child's skin was stained black where soiled by the urine. This could not be washed off by ordinary means, but gradually wore off. There were no color changes in the conjunctivae or ears, and no color change in the urine in the stopped test tube. The child is now, as above stated, four years old and has been able to control the bladder for a year and a half. The mother states that now there is nothing to call her attention to any abnormality except when the child temporarily relaxes his sphincter control. So far as can be determined, there has been no period when the child has not been excreting homogentisic acid in the urine.

P. E. The child is fairly developed and fairly nourished, is every active and energetic, and has never been sick enough to see a physician; there are a few stains on the skin of the thigh, appearing very much as if painted with a strong silver nitrate solution; there is no general adenopathy; there are one or two palpable glands in the anterior cervical regions; the mucous membranes are normal in color; the throat shows no enlargement of tonsils or adenoids; the teeth are developing normally; the tongue is clean; the heart area and sounds are normal; the lungs are clear on percussion and auscultation; the abdomen is not distended; there are no masses; the spleen is not felt; the kidneys are not palpable; the extremities are negative.

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Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 15351

ORTHOPNEA

MEDICAL DEPARTMENT

A Portuguese Negro from the Cape Verde Islands fifty-six years old entered January 30 complaining of orthopnea of ten days' duration. The history, brief as it is, had to be obtained by leading questions because of his orthopnea, discomfort, language difficulty and lack of intelligence.

For a month before admission he had had increasing dyspnea. Medicines given by his physician gave no relief. Ten days before admission he began to have cough with half a cupful of white frothy sputum a day. For a week he had had palpitation, a feeling of drowsiness, and anorexia due to epigastric pain and fullness whenever he ate or drank, and had not been able to lie down, but had slept in a chair. Once he vomited. For a week his urinary output had been small. Recently he had noticed a tightness in his chest. The day of admission he noticed flecks of blood in the sputum.

He had always been strong. Like everyone else in the Cape Verde Islands, he had had many fevers lasting two or three days. He had been in Massachusetts for eighteen years. Thirteen years before admission he had a penile lesion that cleared up in a week. He denied all other symptoms of venereal disease. For seven months he had urinated once at night. His bowels were constipated.

Clinical examination showed a well nourished man, very dyspneic and orthopneic. Teeth bad. Marked pyorrhea. Apex impulse of the heart not seen or felt. Left border of dullness 10 centimeters from midsternum, 2 centimeters outside the midclavicular line, right border 3 centimeters, supracardiac dullness 5.5 centimeters. At the apex was a soft systolic murmur and a loud early diastolic; at the base a louder systolic and the same early diastolic heard also along the left border of the sternum. Rhythm regular. Sounds of good quality. Pulses normal. Artery walls palpable and tortuous. Blood pressure 140/50. An electrocardiogram showed normal rhythm, rate 100, rather low T waves. Expansion of the right lung greater than the left. Crepitant râles throughout the left lower lobe posteriorly. Liver dullness increased downward below the costal margin. Tender right upper quadrant. The patient resisted palpation here. There was a penile scar. Prostate large, tender, symmetrical. Edema of the legs to midleg.

Urine: 32 to 46 ounces, specific gravity 1.029 to 1.030, urine cloudy at all of three examinations, the slightest possible trace of albumin once, 2 to 3 leucocytes in one of three sediment examinations. Renal function 50 per cent. Blood: 17,900 to 11,700 leukocytes, 85 per cent polymorphonuclears, hemoglobin 80 per cent, reds 4,620,000, smear normal. Two Hinton and two Wassermann tests strongly positive.

Temperature 96.6° to 99.7°. Pulse 80 to 100, with a terminal increase to 128. Respirations 20 to 32, with a terminal increase to 43.

X-ray examination showed the size and shape of the heart shadow to be within normal limits. The aorta was not increased in its transverse diameter. It was a little wide across the auricle. There was rather coarse mottled dullness occupying the greater portion of both lung fields. The changes were more marked around the root and gradually faded out toward the periphery. They obscured the outline of the heart and the aorta. The diaphragm was visible on both sides. Its respiratory movements were limited. On the left the costophrenic sinus was distinct. The examination did not show any positive evidence of luetic aortitis or enlargement of the heart. There was probably some dilatation of the auricles.

Under digitalis the edema disappeared and for a few days the patient improved. February 5 and 6 he was very delirious and thought he was being killed. A psychiatrist thought the delirium was associated with the physical disease and might be transitory. February 6 the patient was very dyspneic all day. That night he suddenly died in a fit of anger.

DISCUSSION

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

The history of the present illness all tends to make us think of a heart lesion back of it all, with passive congestion of the different parts of his body.

I suppose the fevers were malaria or unidentified types of infection.

NOTES ON THE PHYSICAL EXAMINATION

Those percussion measurements are all within normal limits for an adult man. We have no proof so far of cardiac enlargement.

The essential thing in the blood pressure is the pulse pressure of 90, which of course is increased.

From the electrocardiogram, on the basis of a low T wave with nothing else, I do not think anyone would venture to say anything in particular.

The penile scar does not in the least prove that he had had syphilis. Duerey's infection, chan-

croid, leaves scars more often than syphilis.

The urine is normal. The blood is essentially normal until we come to the Hinton and Wassermann tests.

It is rather surprising that X-ray showed the size and shape of the heart shadow within normal limits, because we have a diastolic murmur and presumably aortic regurgitation, and in most cases the left ventricle is hypertrophied. I should not be surprised if it was hypertrophied here, and the heart does weigh more even if it has not stretched,—the concentric type of hypertensive heart with very little dilatation. Hypertrophy-and-dilatation usually is thought of as all one word. Now and then we find hypertrophy without dilatation.

We have no evidence of aneurysm from the X-ray.

The signs in the lung fields are presumably due to passive congestion, perhaps to bronchopneumonia. We cannot tell from the X-ray. Such changes around the root make you think of passive congestion.

I suppose the costophrenic sinus was indistinct on the other side, presumably from fluid.

I do not believe X-ray can make the diagnosis of luetic aortitis unless there is aneurysm.

The psychiatrist did not think the patient had any of the regular types of insanity.

DIFFERENTIAL DIAGNOSIS

What are the essential facts in this case? A man of fifty-six, a Negro, always well except for possible syphilitic infection,—we do not know about that—and for fevers which we cannot believe had any permanent effect upon him. He seems to have dyspnea, orthopnea, passive congestion; probably has heart disease. We listen to the heart and find a diastolic murmur and nothing else. That is enough to make a diagnosis of aortic regurgitation, especially when backed up by a large pulse pressure such as there is in this case. The rest of the physical examination shows positive Wassermann and Hinton tests and passive congestion, probably shown in the liver, the lungs and the legs. The diagnosis is syphilitic heart disease and aortic insufficiency. What did he die of?

A PHYSICIAN: Infarct of the heart.

DR. CABOT: That is possible. But what symptom that he did not have here would you expect if it is infarct of the heart? He ought to have had pain. Dr. Mallory has shown us cases of coronary occlusion without pain, so that does not exclude occlusion of the mouth of the coronary arteries where the syphilitic process is. It may have been the cause of death. It does not seem to me that we have enough passive congestion to account for death. His legs were not much swollen and his lungs were only moderately congested.

Coronary occlusion is as good a suggestion as I can make as to the cause of death. I do not believe there was a brain lesion. There may be a terminal infection, bronchopneumonia most probably, which would account for the delirium and perhaps account for death. My diagnosis is syphilitic aortitis with aortic regurgitation; then possibly occlusion of the coronary arteries and sudden death from that cause, or very possibly bronchopneumonia and death from that cause.

A PHYSICIAN: He died in a fit of anger.

DR. CABOT: That is a good point. That suggests angina pectoris. He did not have that, or if he did have it he did not tell about it. Anger raises the blood pressure. He could conceivably have had cerebral hemorrhage. We should expect some paralysis if he had. Any tendency to coronary disease would be worse under those conditions.

A PHYSICIAN: Could he have had a sufficiently sclerotic condition of the blood vessels to cause hemorrhage in the brain?

DR. CABOT: We should expect from his age and his race that he had arteriosclerosis, but in the absence of paralysis and essentially focal symptoms I do not see how we can say more about sclerosis in the brain.

A PHYSICIAN: Does the absence of paralysis exclude brain lesion?

DR. CABOT: No, I do not see how we can say that. Cerebral hemorrhage causes sudden death without paralysis or any symptoms within a few hours quite often.

A PHYSICIAN: But this man died in a few minutes.

DR. CABOT: That is a good point. That seems rather too sudden for cerebral hemorrhage. We think of cerebral hemorrhage when we see a sudden death, but not so sudden as this.

A PHYSICIAN: How do you account for the leukocytosis?

DR. CABOT: It may be due to a terminal infection, and the commonest terminal infection is bronchopneumonia.

A PHYSICIAN: Could it be embolism in this case?

DR. CABOT: You cannot make a diagnosis of embolism unless you can say where it comes from and where it lands.

A PHYSICIAN: You can say aortic regurgitation, poor heart action, clot there.

DR. CABOT: Yes; but the question is not only whence, but where to? He may have had something break off from the aortic valve. But he would not have clots on the valve in luetic aortitis. He would not have a good source for pulmonary embolus, i. e. embolus from the right ventricle, formed there just from poor heart action, in a brief decompensation of this grade. Cases in which you get intraventricular clot and death have usually been decompensated for months. We have not much to base pulmonary embolism on, but it is possible.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Syphilis.
Syphilitic heart disease.

Aortic insufficiency.
Syphilitic aortitis.

DR. RICHARD C. CABOT'S DIAGNOSIS

Syphilitic aortitis with aortic regurgitation.
Possibly occlusion of the coronary arteries.
Very possibly bronchopneumonia.

ANATOMIC DIAGNOSIS

1. *Primary disease.*

Syphilitic heart disease.
Syphilitic aortitis.

2. *Secondary or terminal lesion.*

Bacterial endocarditis.
Chronic passive congestion.
Cavernous hemangioma of the liver.

DR. TRACY B. MALLORY: This man had syphilitic heart disease. The heart was hypertrophied somewhat, weighing over 500 grams. There was definite insufficiency of the aortic valve. There was also a terminal infection, which however was a somewhat surprising one in that it was bacterial endocarditis, which in my experience is relatively uncommon as a sequel of syphilitic heart disease. The majority of cases of subacute bacterial endocarditis infection show an antecedent rheumatic infection, although congenital lesions not infrequently are predisposing factors.

All the other organs were essentially negative. The aorta showed some evidence of syphilis, but nowhere enough dilatation to cause aneurysm. There was an anomaly of the liver, probably congenital, of no significance.

DR. CABOT: One point of interest is that you can have a heart as big as this, 500 grams, and X-ray does not show it. Was there the type we call concentric hypertrophy?

DR. MALLORY: The statement is not made in the record and I do not remember perfectly.

DR. CABOT: You would agree, wouldn't you, that there is such a thing as concentric hypertrophy?

DR. MALLORY: It is the rule in aortic stenosis, but very much the exception in aortic insufficiency.

DR. CABOT: Why this heart was not big in the X-ray you cannot explain?

DR. MALLORY: No.

A PHYSICIAN: Did you find anything to account for the sudden death?

DR. MALLORY: No, I did not, except that the acute bacterial endocarditis unquestionably played a considerable part in the picture, and the heart was probably in much worse shape than the mere symptoms of decompensation suggested.

DR. CABOT: I do not see that we can blame ourselves for not suspecting bacterial endocarditis. You can suspect it only when you have heart murmurs not otherwise accounted for, or embolism, or a positive blood culture. We had no evidence of embolism, no positive blood culture. We cannot say we were wrong because we forgot anything or reasoned wrong.

CASE 15352

RECURRING ATTACKS OF DIARRHEA WITH MUCUS AND BLOOD IN THE STOOLS

MEDICAL DEPARTMENT

First admission. A Nova Scotian milk teamster of twenty-nine entered February 27, fourteen and a half years before his last admission. The chief complaint was attacks of cramps and diarrhea.

During the past three years he had had five or six of these attacks, the first ones mild, the last two very severe. The July before admission an attack lasted for two months, with very severe abdominal cramps and movements every fifteen minutes to an hour. The stools were small and contained jelly-like material. The cramps were relieved by the movements, but tenesmus was marked. His appetite was increased. He was in bed for six days with a little fever, and could not work for two months. He lost weight, but regained it rapidly after the attack ended. Four weeks before admission an attack began which had lasted three weeks. It was less severe than the one in July. During the periods of remission he was well except for a sense of weight in the right lower quadrant and a desire to defecate without result.

Clinical examination, including the abdomen, was negative except that the ileocecal valve was open. Eight stool examinations were negative. Proctoscopic examination was negative.

March 11 he was discharged slightly relieved, with a diagnosis of chronic colitis and neurasthenia.

History of interval. For a year he was free from symptoms. Then the attacks of diarrhea recurred once or twice a year lasting three or four months. At first they were relieved by medical treatment, "washing out the bowel", but after two years they persisted in spite of treatment. From the tenth year after his first admission they became more prolonged and frequent. He had eight or ten movements by day and every hour at night. The stools were watery and jelly-like, the amounts decreasing to a tablespoonful toward the end of the attack. Occasionally there were very minute amounts of blood. His physician told him that tests for occult blood were positive. He had "gas pains," not localized. When the diarrhea was severe he had tenesmus and pain at stool. A little over twelve years after discharge he was in a hospital for three days. A barium meal was negative. After this he was symptom-free for two weeks. At this time he had all his lower teeth extracted. His upper teeth had been extracted nine months earlier because of pyorrhea and sore gums.

Nine months after this he was told at the Out-Patient Department of another hospital that he had asthma. This was his first knowledge of the fact. He had a severe cold at the time. During the eight months before his second admission he had edema of the legs and ankles three or four times lasting a day or two. For three weeks before re-admission he had momentary dizziness on moving his head.

Second admission. September 29, fourteen and a half years after his discharge, he re-entered.

Clinical examination was negative except for diminished breath sounds at both bases.

Urine not remarkable. Blood: 15,100 to 25,000 leukocytes, 76 to 77 per cent polymorphonuclears, hemoglobin 70 per cent, reds 5,760,000, two smears normal except for moderate anisocytosis once. Stools: mucus in two of three specimens, guaiac strongly positive twice, negative once. Stool culture showed colon bacillus. A smear showed no tubercle bacilli.

Chart not remarkable.

X-ray examination with a barium enema was negative. The chest was negative.

A proctoscopic examination showed irritable and injected mucosa. Three later proctoscopic examinations are not reported in detail. Smear from one showed no pathogens of the colon typhoid group and no Gram-positive cocci. Smear from another showed colon bacilli and enterococci. Smear from a third showed bacillus mucosus capsulatus and bacillus lactic aerogenes. The culture which was relied upon to show Gram-positive cocci was contaminated by a spreader.

October 27 the patient was discharged unrelieved, with a diagnosis of chronic colitis.

History of interval. For the next five months the patient was no better and no worse, although his weight increased from 100 to 118. He had cramp-like pain in the lower abdomen relieved by bowel movements. It occurred chiefly at night, waking him, though it was not severe. He had bloody diarrhea with mucus. He had painful hemorrhoids which bled at times, but the bloody movements occurred when he was having no trouble with hemorrhoids. He passed a great deal of gas by rectum.

Third admission. March 27, fourteen years after his first admission, he entered for the third time.

Clinical examination was negative except for external hemorrhoids.

Urine not remarkable except for leukocytes at both of two examinations. Blood: 9,550 to 20,300 leukocytes, 73 to 62 per cent polymorphonuclears, 16 per cent eosinophiles at both of two differential counts. Reds normal.

Discussion

BY GEORGE CHEEVER SHATTUCK, M.D.

In this case we have to deal with a recurring diarrhea in which mucus occurred in the earlier attacks and blood was observed in some of the more recent attacks. The statement is made and can I think be accepted at face value that although there were hemorrhoids the presence of blood in the stools could not always be attributed to this cause. Some of the attacks were so severe as to necessitate treatment in bed. Fever was observed on at least one occasion.

First thoughts would be of some form of colitis of infectious origin. The age of the patient and the duration of the symptoms rule out cancer. Cases of tuberculous colitis which I have seen have had a shorter and less intermittent history. Failure to find tubercle bacilli in the stools of such cases carries little weight, but absence of signs of tuberculosis in other parts of the body is important. Tuberculosis seems unlikely in this case, but it cannot I think be definitely ruled out.

Other recognizable forms of colitis may be caused by bacilli of the dysentery group or by the hystolitic ameba and rarely by the *Balantidium coli.* Stool culture was negative for dysentery on one occasion. Failure to find the dysentery bacillus in a single cultural examination of the feces is far from conclusive, because organisms of this group are apt to be over-grown, especially if the stool specimen is not quite fresh when it reaches the laboratory. The only proctoscopic finding, that of an injected mucosa, might go with any form of dysentery. Amebic dysentery often shows ulceration in the lower bowel, but this is by no means constant.

There is one important fact about the stools of which there is no mention. In bacillary dysentery the microscope shows an exudate consisting largely of leukocytes and endothelial cells. In amebic dysentery they are not numerous. The chronic form of colitis which may be caused by the dysentery bacillus is not likely to show such prolonged and complete remissions as in this case. Neither are they usual in amebic dysentery, although well marked remissions are a common feature of this disease. Typical amebic dysentery has occurred in Nova Scotia. "Eight stool examinations were negative" at the time of the first admission. We may presume, I think, that this statement refers to the ameba, but I should like to know how fresh the stools were when examined. In many hospitals it is extremely difficult to obtain fecal material which is fresh enough to be satisfactory for examination for protozoa, because hospital routine relegates the collection of specimens to those who are on duty at night. Eight negative examinations for the ameba, if performed upon satisfactory material by a person sufficiently conversant with the ameba to recognize it, should exclude not only this disease but balantidial dysentery as well.

The *Balantidium* is easy to recognize. Only a few cases of undoubted balantidial dysentery have been recorded. The first proved case was described by Richard P. Strong many years ago

from the Philippine Islands. In this case the organisms were found in great numbers in the walls of ulcers in the bowel. In most of the cases of human infestation with the *Balantidium* this organism does not cause important pathology.

At the second admission there was a high white count on two occasions, but the count was normal on another occasion. This might perhaps have been caused by pyogenic organisms invading the tissues through preëxisting ulcers, but a leukocytosis is not expected in any form of colitis except when combined with liver abscess. An eosinophilia of 16 per cent observed once is not inconsistent with amebic dysentery, in which eosinophilia may or may not appear. Verminous infestation may be excluded as a cause of this eosinophilia by the numerous stool examinations, in which ova would surely have been found if present.

The colitides of chronic nephritis and of pellagra are excluded by the absence of other signs of either disease. Sprue does not cause bloody diarrhea, and it has other features which were not observed.

There remain for consideration various obscure forms of chronic colitis in which bacterial infection of some unrecognized sort presumably plays the chief part. Expert bacteriological examination alone can elucidate these conditions. Some of them which have been studied by Hans Zinsser appear to have been caused by bacterial flora which were abnormal in that deficiency of acid-forming organisms was a feature. Such cases may recover on a diet mainly of buttermilk or koumiss. Other cases described by Bargen and his associates were attributed by them to a Gram-positive diplococcus. Cultures in this case failed to show such a diplococcus.

Probability seems to place this case in the group of infectious colitides, the bacteriology of which is still uncertain, but chronic bacillary dysentery and particularly amebic dysentery have required serious consideration and have not been convincingly excluded. For these diagnoses one must lean heavily on the laboratory. The edema of the legs seems not to fit in with other facts and I am at a loss to account for it.

Further History

Examination of warm fresh stools showed many actively moving amebae on two different days. The organism was identified as the *Entameba histolytica*. Guaiac was positive in two stool specimens. Culture from proctoscopy showed Gram-positive diplococci, not agglutinating with Bargen's serum.

Orders: March 27. Enteric precautions. Low roughage diet. Yatren 0.5 grams in gelatin capsules six times a day on the first, third, fifth and seventh days. Yatren 3.0 grams dissolved in 200 cubic centimeters of distilled water at 80° centigrade to be given as an enema after a cleansing enema and retained as long as possible on the second, fourth, sixth, tenth, fourteenth and twenty-first days. Rest in bed most of the time, especially after enemas. April 2 emetin hydrochloride half a grain intramuscularly and one grain intramuscularly daily for four days. April 6 yatren three grams in 200 cubic centimeters of distilled water at 80° centigrade as above, today and April 8. April 7 emetin hydrochloride intramuscularly one grain for two more days. April 9 resume yatren 0.5 grams six times a day.

The patient was comfortable in the ward April 2 many dead but no live amebae were seen in a stool which had been kept warm an hour and a half before examination. By April 7 he was symptom free, with one movement of the bowels daily. April 10 he was discharged improved, with orders for yatren enemas weekly for three weeks.

Further Discussion

The finding of *Ameba hystolitica*, numerous in the stools, serves not only to clear up the diagnosis but also to *emphasize the probability that adequate examination of suitable stool specimens would have given a clear diagnosis at the time of the first admission fourteen years before.*

Diagnoses

First Admission

Chronic colitis.
Neurasthenia.

Second Admission

Chronic colitis.

Third Admission

Amebic dysentery.

CASE 15353

RECURRING PYREXIA DIAGNOSED AND TREATED AS TUBERCULOSIS

Medical Department

A farmer thirty-three years old, of Russian parentage, entered September 27 complaining of fever and weakness of seven months' duration and of discomfort in the abdomen and epigastrium of six months' duration.

Seven months before admission he had the severest cough he had ever seen, unproductive. He had moderate fever and profuse night sweats. There was an epidemic of influenza at that time and he was given that diagnosis. The cough ended in three days, but a fever of 101° to 103°, night sweats, dyspnea and a feeling of rapid pulse had been almost constant up to admission. After two weeks he was so weak that he had been unable to work since that time. The fever ordinarily began in the middle of the afternoon and

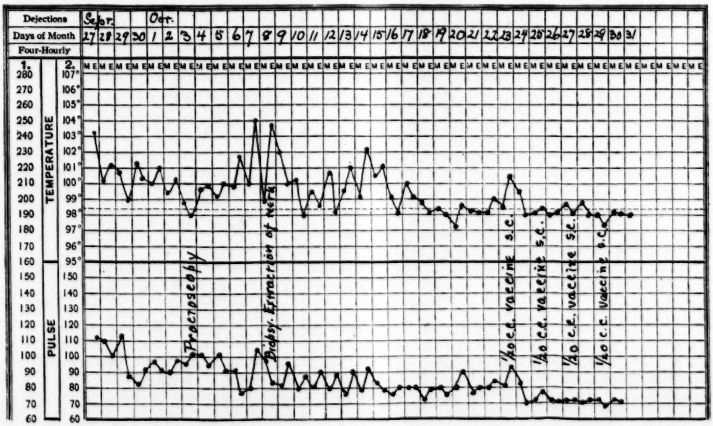
continued into the night. If he did not have profuse night sweating the fever would start in the morning and abate by early afternoon. He had frontal headache lasting about two hours every morning. His physician sent a specimen of his sputum to the State Board of Health. It was reported negative. In March he was in bed for a week with continuous sharp lower abdominal pain, extremely severe at night, doubling him up. For six months he had had loss of appetite and morning nausea. About three o'clock every afternoon he had gas in his stomach with a feeling of heaviness and epigastric discomfort relieved somewhat by supper, then recurring at nine o'clock and lasting practically all night until passage of much flatus relieved it early in the morning. Bromo-seltzer, soda and food also gave relief. He sometimes went for several days without eating. He began to have diarrhea, which had persisted. He had never seen blood or tarry stools. Four months before admission he was sent to Rutland, where examination, including X-rays of the back and chest, showed no evidence of tuberculosis. A week later he was sent to another hospital for blood tests, which also were negative. As he had been in China, the Philippine Islands and Hawaii eight years previously he was treated with quinine for two days. Seventeen days later he was discharged feeling much worse than before. He consulted two other physicians, neither of whom could make a diagnosis. One was suspicious of tuberculosis. The patient was again examined in Rutland August 9, again with negative results. From this date until September 1 he was free from sweating and fever, and felt so well that he was about to resume work when all his symptoms returned, more severe than before. During the seven months of illness his weight had fallen from 205 to 195, ten pounds.

He had never had any disease until the present illness and had always been very rugged. He urinated two or three times at night. He developed a painful tooth abscess after entering the Emergency Ward at this hospital.

Clinical examination showed a very well developed and well nourished young man with hot, dry and slightly pale skin. Tongue rather dry, with very slight furring. Tonsils slightly red and adherent. Pyorrhea. The apex of the right lung showed slight dullness. Heart not enlarged. Action regular, slightly rapid. Sounds of fairly good quality. A short systolic murmur at the apex. Radials and brachials just palpable. Abdomen distended, full, not tense, tender. The examination was unsatisfactory because of voluntary spasm and heavy musculature. The spleen seemed palpable two or three finger-breadths below the costal margin. There was sensitiveness but not true tenderness in both costovertebral angles. Rectal examination showed slight tenderness; otherwise it was negative.

Urine: amount not recorded, specific gravity 1.005 at one examination, 1.015 to 1.030 at seven others, 1 to 5 leukocytes per field at seven examinations, 1 to 5 red cells at two, acetone at one, diacetic acid at one. Renal function 35 per cent (two tests). Blood: 4,400 to 11,000 leukocytes, 46 to 48 per cent polymorphonuclears, hemoglobin 60 to 75 per cent, reds 4,000,000 to 4,500,000, slight variation in size and shape in one of two smears. Hinton negative. Widal negative for typhoid and paratyphoid A and B. No agglutination with bacillus abortus (two tests) or micrococcus melitensis. Stools negative to guaiac. No tubercles found in two examinations. Stool culture negative for typhoid.

Temperature and pulse as shown in the chart.



Respirations normal after a count of 30 the evening of admission.

X-ray examination showed slight general enlargement of the heart. There was no positive evidence of Hodgkin's disease. A barium enema showed no definite organic pathology. There was a considerable amount of gas in the transverse colon and flexures so that the examination was not entirely satisfactory. Three teeth showed root abscesses. Plain gall bladder plates showed no visible gall stones. There was an unusual amount of gas in the bowel. A Graham test suggested abnormal function. The gall bladder was not well shown in the plates. Examination with a barium meal showed no organic pathology.

A medical consultant thought the spleen seemed firmer than the usual septic spleen and advised a therapeutic test of X-ray to the splenic region. A bacteriologist laid emphasis on the long drawn out course, the present physical findings and the occurrence of contagious abortion among the patient's own cattle and those on neighboring farms. A dentist extracted a molar and took a culture from the socket. A surgeon found that the abdomen "did not feel right, but without anything definite to feel." A urologist found insufficient evidence to warrant thorough urological investigation.

Discussion

BY GEORGE CHEEVER SHATTUCK, M.D.

The history of the illness of seven months before admission points unmistakably to an acute infection accompanied by transient laryngitis. The infection originated, probably, in the respiratory tract. There were pronounced constitutional symptoms of so indefinite a character that the diagnosis of influenza was made at that time. Is influenza a specific disease or is it a syndrome which can be produced by various organisms? I do not believe that this question can be answered satisfactorily as yet. However, I incline to the view that epidemic influenza, whether or not caused by Pfeiffer's bacillus, is caused by a specific organism, but that other respiratory infections can produce similar symptoms which may be clinically indistinguishable from those of influenza.

The infection in this case became chronic, but localizing signs were not observed until abdominal pain appeared six months after the onset. This pain might have been due to a metastatic infection from tonsils or teeth, lodging in the appendix or gall bladder. That the nature of the condition was obscure is shown by the fact that the patient was sent to a sanitarium for tuberculosis, although no local signs of tuberculosis had been discovered. Seriously painful digestive disturbance is shown by voluntary fasting for several days at a time. Hyperacidity is indicated by relief after taking food or soda. If gastric ulcer can be caused by metastatic infection this might be such a case. On the other hand the hyperacidity may be symptomatic of something else. The diarrhea developed late and seems, like the abdominal pain, to be a secondary feature, but the possibility remains that we have to deal here with an acute respiratory infection followed by or complicated by some independent abdominal lesion.

Frequent micturition at night seems unimportant in view of the essentially negative urine examination and the presumable absence of polyuria. The finding on one occasion of acetone and diacetic acid is probably related to a temporary insufficiency of food. The low renal function, 35 per cent, may be important, but the test was not repeated and the suggestion of renal damage which it gives does not seem related to other facts.

The low percentage of polynuclear leucocytes in the blood, with a white count practically normal, points to a slight excess of lymphocytes, which is often associated with mild chronic infections. The reduced hemoglobin and the slightly low red count point the same way.

Tuberculosis is the commonest cause of debility with chronic irregular fever. Tuberculosis is generally recognizable in lungs or glands. It seems unlikely in this case. Splenic enlargement may go with miliary tuberculosis, endocarditis, typhoid, or malaria. The duration excludes typhoid. The visit eight years previously to the tropics leads one to think of malaria and of amebiasis with liver abscess. Malaria seems very improbable in view of the long interval of seven to eight years without fever, but the possibility of liver abscess developing from a latent amebiasis requires adequate stool examination for the ameba. The importance of adequate stool examinations has been emphasized in the discussion of the preceding case, Case 15352. In liver abscess the liver is not always enlarged, tenderness may not be definitely localizable, and in a large proportion of cases the diagnosis is made too late or not at all during life. In any case of obscure fever in a person who has been in the tropics it is well to consider very seriously the question of liver abscess. We are given no data on stool examination for amebiasis. Therefore the question of liver abscess remains open.

Chronic endocarditis, too, is a most insidious disease. In the early stages the heart may not be demonstrably enlarged. Tachycardia disproportionate to the fever may or may not be a feature. In this case pulse-rate is proportional to temperature and the slight enlargement of the heart shown by X-ray may be of long standing and not related to the present illness. The sys-

tolic murmur may be unimportant. Endocarditis cannot be excluded.

The irregularity of the fever, occasionally higher in the morning than at night, and the sweats suggest some form of sepsis. Abscesses were found at the roots of some of the teeth, but the symptoms did not abate on removal of a tooth.

Genito-urinary infection as the essential condition can, I believe, be excluded by lack of signs. I reach the same conclusion with regard to appendicitis. The condition of the gall bladder is doubtful, and perforating ulcer of the stomach, walled off by adhesions, occurs to me as possible in spite of negative X-rays. They are strong evidence against chronic pathology in stomach or gall bladder. *Brucella melitensis* or *Brucella abortus* can produce a chronic relapsing or intermittent fever of which night sweats and splenic enlargement are common features. The fact that the patient's cattle suffered from infectious abortion suggests this disease, but I am at a loss to explain the rather severe abdominal symptoms on the same basis. The negative agglutination tests are further evidence against the disease. The temperature is atypical but not inconsistent with undulant fever.

Summary: A diagnosis does not emerge. In its stead there remain a number of possibilities, as follows: (1) liver abscess; (2) endocarditis with intra-abdominal infarction of slight severity; (3) chronic infection of the gall bladder or chronic perforating ulcer of stomach; (4) undulant fever. Numbers 1 and 4 seem far fetched and lacking in support. I am unable to decide between 2 and 3.

Further History

October 8 under local novocain glands were removed from both groins. Cultures from these showed a growth of non-hemolytic streptococcus (gamma). A blood culture by symbiotic growth with diptheroid bacilli also showed non-hemolytic streptococcus (gamma). A vaccine was prepared and given October 23, 25 and 27. October 23 the patient was comfortable. The abdomen remained somewhat distended, doughy and showed a questionable small amount of fluid. There was no reaction from the vaccine. October 31 the patient was discharged with orders for rest and immediate dental attention.

Further Discussion

The finding of a non-hemolytic streptococcus in excised glands and in the circulating blood points to a serious localized infection. Should the symptoms continue after extraction of all infected teeth, an active endocarditis would seem extremely probable.

DIAGNOSIS

Septicemia, non-hemolytic streptococcus.

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THE NEWER FORM OF TREATMENT OF EPILEPSY

CONSIDERABLE success has been obtained by treating the epileptic by a ketogenic diet. The method has proved itself to be especially valuable in the treatment of children and Talbot[1] has been able to report a symptomatic cure in approximately one-third of his cases. Enough time has now elapsed since the ketogenic diet treatment was inaugurated under controlled conditions to evaluate its worth and to speculate in regard to the cause of the cessation of epileptic seizures. Theoretically, by this treatment a relative acidosis is established which offsets the waves of alkalosis said to precede a seizure. Many workers, however, do not believe that there is a definite alkalosis preceding an attack; Lennox[2] and his co-workers find that there is some variation in the alkalinity of the blood, although within a range considered as normal.

To overcome the negative findings of Lennox another theory has been propounded, which brings out the point that because of the low level of carbohydrate metabolism when the ketogenic diet is used, there is a great reduction of general body water, both intracellular and extracellular. Dehydration takes place generally and, it is believed, as much in the cranial cavity as elsewhere.[3] If, as Fay believes, epileptic seizures are due, at least in large part, to a supra-cortical oedema, the success obtained by a special diet might be attributed to the fact that some of the oedema is removed. This oedema is probably the result of a failure of the cerebrospinal fluid to be properly evacuated through the subarachnoid villi or Pacchionian granules into the venous sinuses. Fay believes that most of the cerebrospinal fluid is absorbed in this manner. At birth one finds a small collection of cells associated with large venous sinuses. They reach their adult state about the 20th year of life. If they are as important as Fay would have us believe, slight injuries due to inflammatory, traumatic or toxic conditions, congenital malformations and other causes may upset these important structures which release the cerebrospinal fluid from the subarachnoid spaces over the cortex. The accumulation of fluid under these pathological conditions would be excessive, a condition usually found on post mortem examination of epileptic brains.

In addition to this mechanical theory of epilepsy, one must necessarily grant an additional precipitating factor as the cause of the actual seizure. Fay believes that this precipitating factor is usually on a circulatory basis. Whether the theory of Fay in regard to the mechanism of epilepsy is correct or not, it is only fair to state that the latest methods of investigation of the subarachnoid space, by injections of air into the lumbar spinal sac and allowing it to ascend so that it appears over the cortex and in the ventricles of the brain by x-ray examination, bears out his contention. Dr. Fay exhibited, at the recent meeting of the American Medical Association in Portland, Oregon, a remarkable series of x-ray plates demonstrating the points briefly enumerated above. His work caused much interest and one looks forward hopefully to his further investigations of this difficult field.

REFERENCES

1 Talbot, F. B., Metcalf, K. M., Moriarty, M.: A clinical study of epileptic children treated by Ketogenic diet. Boston M. and S. J., 196: 89-96. (Jan.) 1927.
2 Lennox, W. G.: The effect on epileptic seizures of altering the acid-base relationships of the blood. J. Clin. Investig., 4: 429, (Aug.) 1927.
3 Fay, Temple: Some Factors in the "Mechanical Theory of Epilepsy," with Especial Reference to the Influence of Fluid, and its Control, in the Treatment of Certain Cases. Am. Jour. Psychiatry, 8: 783, (March) 1929.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

CAMPBELL, HUGH B. M.D. University of Pennsylvania 1909. Ex-President, Eastern Section American Sanatorium Association; Superintendent, State Tuberculosis Sanatorium, Nor-

wich, Conn. He writes on: "Complications of Tuberculosis—Hemoptysis, Pleurisy and Spontaneous Pneumothorax." Page 395. Address: Norwich State Tuberculosis Sanatorium, Norwich, Connecticut.

GRIFFIN, WALTER A. A.B., M.D. Harvard 1900. Superintendent, Sharon Sanatorium; Instructor in Graduate School of Medicine, Harvard. He writes on: "Tuberculosis of the Intestines." Page 401. Address: Sharon Sanatorium, Sharon, Massachusetts.

ERNLUND, CARL H. A.B., D.M.D., M.D. Harvard 1922. Laryngologist, Massachusetts State Cancer Hospital, Pondville; Assistant Laryngologist, Deaconess Hospital, Boston; Assistant Otolaryngologist, Palmer Memorial Hospital, Boston; Clinical Assistant, Massachusetts Eye & Ear Infirmary, Boston. He writes on: "Laryngeal Tuberculosis." Page 408. Address: 5 Bay State Road, Boston.

LORD, FREDERICK T. A.B., M.D. Harvard 1900. Visiting Physician, Massachusetts General Hospital; President, Massachusetts Tuberculosis League; Faculty Instructor in Medicine, Harvard Medical School. He writes on: "The Effect of Bronchitis, Influenza and Pneumonia on Pulmonary Tuberculosis." Page 410. Address: 305 Beacon Street, Boston.

GUTHRIE, R. H. M.D., University of Tennessee 1921. Assistant Superintendent, Monson State Hospital, Palmer, Massachusetts; Formerly Medical Officer, Boston Psychopathic Hospital, Boston. He writes on: "A Review of Cases of Pellagra Admitted to the Boston Psychopathic Hospital from 1922 to 1928 with Special Reference to Alcohol as an Etiological Factor." Page 414. Address: Monson State Hospital, Palmer, Massachusetts.

GREGG, DONALD. A.B., M.D. Harvard 1907. Formerly Assistant Professor of Tropical Medicine, University of the Philippines. Now Superintendent, Channing Sanitarium. He writes on: "Avitaminotic Depressions." Page 420. Address: 113 Wellesley Avenue, Wellesley, Massachusetts.

BAGNALL, ELMER S. M.D. Tufts 1913. Visiting Physician, Hale Hospital, Haverhill, Massachusetts. Medical Examiner 6th Essex District. He writes on: "Alkaptonuria." Page 422. Address: 281 Main Street, Groveland, Massachusetts.

RECENT DEATH

MILLET—DR. CHARLES SUMNER MILLET, a pioneer in introducing in this community the out-door treatment of tuberculosis, has died at his home in Brockton at the age of 71. The end came on August 19, 1929. The son of Dr. Asa Millet, of East Bridgewater, he was born in Abington, January 29, 1858, his mother being a Mayflower descendant. He had his education at the Adams Academy, Quincy and at Harvard Medical School where he took his M.D. in 1880. He joined the Massachusetts Medical Society, having settled in Rockland, in 1880, and for years conducted a private sanatorium for cases of tuberculosis at East Bridgewater. He conceived the idea that workers in factories who were affected with tuberculosis might be benefited by life in the open air, during the hours they were not at work. Accordingly he arranged their houses so that they slept and lived in the open. His results, when published, showed a surprising number of successful treatments, especially to those who had believed that night air had been harmful to this class of patients. At the death of his father in 1893, Dr. Millet moved to Brockton. At one time he was connected with the Children's Clinic of the State Department of Public Health. He is survived by his widow and six children. He was a brother of Frank D. Millet, the portrait painter, who was lost on the Titanic.

NOTICES

Dr. Henry I. Shahon has removed from 528 Blue Hill Avenue, Roxbury, to 173 Forsyth Street, New York, N. Y.

OFFICIAL ACTIONS BY THE BOARD OF REGISTRATION IN MEDICINE

At a meeting of the Board of Registration in Medicine on August 15, 1929, the registration of Dr. Eugene M. Brown of Boston was suspended. The registration of Dr. Hormidas Choquette of New Bedford was restored. Dr. Esther Solakian of Boston was placed on probation for one year.

REPORTS OF MEETINGS

THE AMERICAN BOARD OF OTOLARYNGOLOGY

An examination was held in Portland, Oregon, July 8, during the meeting of the American Medical Association. Thirty-seven applicants appeared for examination with 11% failures.

The next examination will be given on Monday, October 21 in Philadelphia, preceding the opening of the meeting of the American Academy of Ophthalmology and Otolaryngology in Atlantic City.

Prospective candidates for certificates should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha, Nebraska, for proper application blanks.

DR. W. P. WHERRY, *Secretary.*

THE THIRTEENTH INTERNATIONAL PHYSIOLOGICAL CONGRESS

This meeting was held in the United States at the invitation of the American Physiological Society at the Harvard Medical School. The Federation of American Societies for Experimental Biology shared in the honor of acting as host to the Congress. It is the first session of the Congress to convene outside of Europe.

Boston was the meeting place of one of the largest scientific gatherings devoted to one department of

medicine when The Thirteenth International Physiological Congress convened on August 19. More than 1200 physiologists from the important countries of the world were in attendance. The scientific work of these men during recent years was presented in more than 600 papers.

Professor William H. Howell of Johns Hopkins University presided.

PROFESSOR WILLIAM H. HOWELL

Beside Professor Howell the International Committee included the following named delegates: Filippo Botazzi of Naples, Otto Frank of Munich, Eugene Gley of Paris, Archibald V. Hill of London, and Johan E. Johansson of Stockholm. Professor Walter B. Cannon of Harvard Medical School was Chairman of the Congress Bureau in charge of arrangements.

The contributions set forth the advances in research pertaining to physiological problems since the last meeting. Many of the titles listed in the program of the Congress dealt with apparatus and demonstrations of the mechanics of experiments. Of the contributions to physiology from year to year, many have come through affiliated sciences. Students of biology whose societies are interested in physiology participated as associate members.

Membership in the Congress is limited to properly accredited persons from foreign countries and to members of the Federation of American Societies for Experimental Biology. Because of the large attendance at recent Congresses it had been found necessary to limit each member to the presentation of only one paper. The program of the Congress contained the abstracts of the 600 papers. French, German, Italian and English were the official languages of the Congress.

The first Congress met in Basle in 1889. The tradition of these Congresses was determined in large part by a movement begun by the Physiological Society in London, and a letter written by members of that Society in 1888. Physiologists in all countries were approached and their support solicited. The first invitation appears below:

Physiological Society, London,
19th March, 1888.

Sir,

It is suggested that the International Meetings of Physiologists should be held at intervals, with the object of promoting the progress of Physiology by the interchange of ideas and mutual friendly criticism, and of affording opportunities to workers in our science of knowing each other personally.

It is proposed to include in the subjects to be brought before such a meeting only those branches of Anatomy, Histology, Physics, and Chemistry which directly bear upon Physiology. With the ample opportunities already existing for the publication of Physiological papers, it appears unnecessary to provide for printing separately the Transactions of the meetings. It is intended that all communications should be as little formal and as fully demonstrative and experimental as possible.

In choosing the place for the first Congress, it has been thought that Switzerland, from its central situation between the most important European States, from the familiarity with it enjoyed by Americans and Englishmen and from the attractiveness of its scenery, offers the greatest advantages. Should this prove to be the general opinion, we have reason to believe that we should be welcomed in the Swiss capital, where there are ample facilities for meeting and for conducting experimental demonstrations.

The time suggested as most convenient is the end of August, or the beginning of September in 1889.

We beg leave to commend this proposal to your favourable consideration, and shall feel much obliged if you will kindly communicate to the Honorary Secretary of our Society your views upon the advisability of the plan and upon the place and time proposed. Such meetings can only be made successful by the united help of physiologists in all countries, and it is to ascertain how far we may depend upon your valued co-öperation, that we have the honor to address to you this preliminary letter.

We are, Sir,

Your faithful servant,

(Signed) J. Burdon Sanderson (Oxford); Michael Foster (Cambridge); Wm. Rutherford (Edinburgh); J. G. McKendrick (Glasgow); J. M. Purser (Dublin); E. A. Schäfer (Gordon); W. H. Gaskell (Cambridge), Hon. Treas. Physiol. Soc.; Gerald F. Yeo (King's College, London), Hon. Sec. Physiol. Soc.*

The plans outlined in the above letter were carried out. Those who signed it and many of those who took part in the first and the succeeding Congresses have contributed to advances in physiology. Meetings of the Congress have been held every three years heretofore in various European cities. The presidents under whom these gatherings have been held, and the places of assembly were as follows:*

Date	Place	President
1889	Basle	J. Holmgren
1892	Liege	L. Fredericq
1895	Bern	H. Kronecker

*Science, Vol. LXVIII, December 21, 1928.

1898	Cambridge	Sir Michael Foster
1901	Turin	A. Masso
1904	Brussels	P. Heger
1907	Heidelberg	A. Kossel
1910	Vienna	S. Exner
1913	Groningen	H. J. Hamburger
1920	Paris	Ch. Richet
1923	Edinburgh	Sir Edward Sharpey Schäfer
1926	Stockholm	J. Johansson
1929	Boston	W. H. Howell

Only once since its first meeting has the regular convocation of the International Physiological Congress been interrupted. In 1913 the Congress convened in Groningen, where 443 members were enrolled, representing 19 different nationalities. The meetings were omitted from 1913 until 1920 when the French arranged a Congress in Paris to which physiologists from allied and neutral nations were invited. At the Edinburgh Congress in 1923 the Central Powers were well represented, and the international character of the Congress was again established at Stockholm in 1926.

At the Paris Congress nineteen nationalities were represented, at Edinburgh twenty-seven and at Stockholm thirty-three. The following table* shows the number of members of different nationalities reading papers at Paris, Edinburgh and Stockholm.

TABLE I

Nationalities	Number of members reading papers		
	Paris 1920	Edinburgh 1923	Stockholm 1926
Argentine	1	—	—
Austrian	—	3	8
Belgian	2	3	8
Canadian	1	7	2
Chinese	—	—	2
Czechoslovakian	—	1	1
Danish	2	—	9
Dutch	11	20	15
Egyptian	1	—	1
English	11	54	20
Esthonian	—	1	—
Finnish	—	3	2
French	39	3	30
Georgian	—	1	—
German	—	18	40
Hungarian	—	—	3
Italian	20	4	4
Japanese	0	1	3
Norwegian	—	—	1
Polish	1	—	8
Portuguese	2	—	—
Roumanian	2	—	3
Russian	—	2	8
Serbian	—	—	1
Spanish	3	—	3
Swedish	5	3	20
Swiss	5	4	1
U. S. A.	8	34	45

TABLE II

	Paris 1920	Edinburgh 1923	Stockholm 1926	Boston 1929
Total number of members reading papers	114	159	238	600
Total number of members enrolled in the Congress	—	408	651	1229

*Science, Vol. LXVIII, December 21, 1928.

Table II gives an idea of the development of this Congress during the past decade.

At the meeting in Stockholm, the Congress unanimously voted to accept the invitation of the American Physiological Society to hold the next meeting in the United States. In April, 1927, at the meeting of the federation at Rochester the following committee, representing society membership in the federation, was appointed: Professors John J. Abel, Wade H. Brown, Joseph Erlanger, William H. Howell, Reid Hunt, Graham Lusk, J. J. R. MacLeod, Lafayette B. Mendel, Phillip A. Shaffer, Torald Sollman, Donald D. Van Slyke, Alfred S. Worthin and Carl Voegtlin.

A subcommittee consisting of Professors Frederic S. Lee, Graham Lusk and Dr. Simon Flexner undertook to raise the necessary funds for the Congress.

Professor William H. Howell of Johns Hopkins University was chosen President of the thirteenth Congress and Boston were selected as the place of meeting. Drs. Edwin J. Cohn and Alfred C. Redfield of Harvard University, were appointed the Secretaries of the Congress. Membership in the Congress is limited to members of the Federation of American Societies for Experimental Biology and to properly accredited scientists from abroad. Other Americans interested in the physiological sciences may attend the scientific sessions as associate members upon introduction by a member of the federation.

Announcements of the meeting of the Congress were sent to foreign physiologists who were members of preceding international congresses or who were members of learned societies interested in the science of physiology. European interest in the Congress was so great that during the Harvey celebration in London, May 1928, ways and means of transportation were discussed by a group of European delegates. Professor A. V. Hill, of University College, secured 300 reservations for members of the Congress and their wives on the S. S. Minnekohda, which sailed from London August 9 and from Boulogne August 10. Twenty-two countries were represented in the list of physiologists who were passengers.

Following this party a delegation of sixty Germans and forty Frenchmen reached Boston.

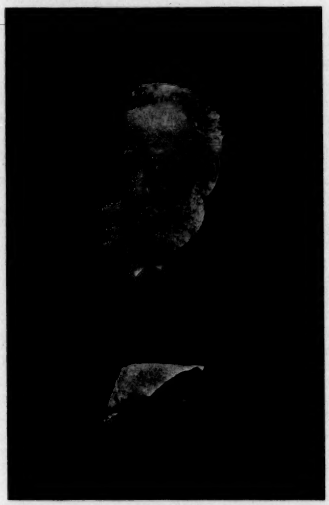
The delegates on board the S. S. Minnekohda were from twenty-two countries: Austria, Belgium, China, Czechoslovakia, Denmark, Egypt, England, Finland, Germany, Greece, Holland, Hungary, Ireland, Japan, Poland, Russia, Scotland, Spain, Sweden, Switzerland, and Wales. Of these, eleven were designated as official delegates by their respective countries. The leaders of the group were Professor Filippo Botazzi of the Institute of Physiology at Naples, Italy, and Professor Archibald Vivian Hill of University College, London, England, who were the two members of the International Committee of the Congress board.

Seven countries had official government delegates on board. They were Associate Professor G. Ahlgren of the Physiological Institute of the University of Upsala, Sweden; Professor Filippo Botazzi as a representative of Italy; Professor A. Hassan of the Medical School of Cairo, Egypt; Professor Amadeo Herlitzka, Professor of Physiology at Turin, Italy, and one of Italy's representatives, Professor G. Joachimoglu of the Medical Academy of Athens, Greece; Dr. D. Lo Monaco, Director of Chemical Physiology, Rome, Italy; Professor John O. Olow of the Univer-

sity of Upsala, Sweden; Professor Z. A. Ovheli of the Medical Institute, Leningrad, Russia; Professor Jacob K. Panos of the Faculty of Medicine, the University, Lwow, Poland; Professor Torsten Thunberg of the University of Lund, Sweden; and Professor Carl Tigerstedt of the Physiology Laboratory, Helsingfors, Finland.

Elaborate arrangements were made to receive the members and their families. At the Harvard Medical School, post office, telegraph, cable, telephone offices, a bank, and an office of Thomas Cook & Son were installed. Throughout the Congress transportation was provided between the dormitories in Cambridge and the Harvard Medical School.

That Russian scientist, Ivan Pavlov, the dean of the world's physiologists, who has been able to count on the whole-hearted support of his government despite his free expression of opinion, was one of the advance guard of the distinguished group to arrive.



PROFESSOR IVAN PAVLOV

Of all the members of international reputation Ivan Pavlov is probably the best known. In 1904 he received the Nobel Prize for his researches on the salivary glands, and previous to that time he had made important discoveries concerning the nerves of the heart. But now, at the age of 80, he is still engaged in work relative to the conditioned reflexes. Until 1923 the extent of his work on the Physiology of the brain was known only to his collaborators, so eager was he to keep his work in hand until all its fundamentals were verified. Research workers pay tribute to him for putting his findings into form for general application.

He has explained the physiological nature of sleep, has given explanations of neurasthenia, hysteria, insanity, and temperament. These researches are so highly regarded by the Soviet Government that he has had official support when other scientists were not endorsed. With others he has suffered because of the impoverished conditions of the Russian people.

Professor Genichi Kato of Keio University, Tokyo, Japan, was one of a number of Japanese members attending the Thirteenth International Physiological Congress. The minute scale upon which Professor Kato has worked in order to reveal to the world new theories about the nerves has brought him recognition in the Occident which is enjoyed to the same extent by his colleagues.

PROFESSOR GENICHI KATO

The extent to which scientific learning has spread throughout the world since the beginning of the century is nowhere better illustrated than in the story of Professor Kato. His entire education from the earliest years through his most difficult scientific instruction was given him in schools and universities of his own country. The popular Western belief that the Japanese are still dependent upon the West for the instruction of their scientists is not substantiated in the case of Dr. Kato.

He would be the first to acknowledge his debt to the Occident. Indeed, he asked that his gratitude to Americans for their assistance in the Japanese earthquakes of 1923 and 1927 be made public, and he declared himself particularly grateful for the support of the Rockefeller Foundation which gave money to build the Institute of Preventive Medicine connected with Keio University. The gift was made just after the most recent earthquake. The Institution is the first of its kind in Japan and its formal opening was celebrated just before Dr. Kato left Japan in May.

This was not Professor Kato's first visit to the United States, for he came to this country during the summer of 1919 when he, at that time as now

a Professor in Keio University, was on a tour of inspection of medical science institutes in this country. He has made three visits to Europe for the same purpose. On his trip to Boston from the West coast he visited many research centers in this country. With him came four of his assistants from Keio University. They visited Leland Stanford, the University of Chicago, Washington University in St. Louis, and the University of Cincinnati, Johns Hopkins University, the University of Pennsylvania, Columbia University and now Harvard. Here Professor Kato spoke at summer classes of the medical school, describing the theory which has made him famous.

His theory won for him in 1927 the Imperial Academy Prize, the highest award in science in Japan, corresponding in that country to the Nobel Prize in world circles. The theory and its proof overturned the former theory describing the action of nerve impulses in narcotized tissues known as the Decrement Theory. According to the old theory a nerve impulse when it came into an area which had been narcotized, with cocaine for instance, acted as if it were a bullet and the further it went the more the resistance of the medium in which it travelled cut down its speed. The speed of the impulse was supposed to grow gradually less. Kato showed that it did not grow gradually less, but grew less all at once and stayed at that speed until it emerged from the narcotized area.

He described the process as one where a powder train is laid, and part of the train is slightly wet. When the burning charge reaches that point it burns less rapidly, but always at a consistent rate of speed, until it emerges on the other side, where it flares up again. His theory was doubly important because scientists who could get into the central nervous system to observe first hand phenomena had said that the decrement theory applied there as well as in the narcotized area and they had built all sorts of other theories around that fact. Now they are reduced to using Kato's theory, which he calls the "Decrementless Theory."

He explained that his Decrementless conduction theory makes the Wedersky Effect theory perfectly clear.

The mysterious manner in which men at the opposite ends of the world working without knowledge of the existence of each other's experiments come to the same conclusions is demonstrated once more in the experience of Dr. Kato. In 1923 he discovered his Decrementless Theory. He wrote on it and had it published in Japanese, but it was not until 1924 that he had the work translated into English. It was the first work of physiology ever printed in English in Japan, and one of the first scientific books so printed. During 1924, before the publication of his work in English was complete, Dr. Alexander Forbes and Dr. Hallowell Davis of Harvard Medical School had come to the same conclusion, without any possibility of knowledge of his experiment. They came upon his English edition while they were writing up their experiment. Since 1924 the theory has been accepted everywhere and all textbooks of physiology have been altered to fit the new theory of nerve conduction.

Professor Kato reads English readily. In order that he and his four assistants may have an even better command of the language they stayed in five separate houses side by side on Beacon Street, Brookline. Each took a room in one of a row of brownstone front houses in order that he might be thrown with English speaking people. Professor Kato was to be found for a month before the Congress opened studying in American and English texts the latest researches of English speaking scientists. To his mind a knowledge of the language is the greatest need of Japanese scientists, for the work which is being done in his country is handicapped by the small amount of translation of scientific texts which has been done. Until this problem is surmounted all the splendid researches of his countrymen will be curtailed and diminished and this will react upon the ambition of the workers who deserve the spur of world-wide recognition enjoyed by other nationalities.

The opening address of the Congress was delivered by August Krough, Director of the Zoöphysiological Laboratory, at the University of Copenhagen, Denmark. He, too, is a Nobel Prize winner, because of his work on the physiology of capillaries. Leon Fredericq, Professor Emeritus of the Institute de Physiologie at the University of Liege, Belgium, and President of the second meeting of the Congress, which was held at Liege in 1892 was present. Johan E. Johansson, Professor of Physiology and Director of the Physiological Laboratory at the Koralinska Institute at Stockholm, President of the preceding Congress, held in Stockholm in 1926 were also in attendance.

Archibald V. Hill, Professor of Physiology at University College of the University of London, who shared with Dr. Otto Meyerhoff of the Kaiser Wilhelm Institute the Nobel Prize for research on muscles and is well known in the United States for his work at Cornell University several years ago where he studied the effect of vigorous exercise on the muscles of runners, was a member of the International Committee for the Congress.

In the winter of 1926-27 Dr. Hill gave the Lowell Lecture in Boston on the subject "Living Machinery." As Foulerton Professor at the University of London he holds a national grant which frees him from all regular lecturing duties and enables him to devote himself to research.

Henry Hallett Dale, a fellow of the Royal Society and a Commander of the Order of the British Empire, is one of the outstanding Englishmen in attendance. He is Director of the Department of Bio-Chemistry and Pharmacology in the National Institute for Medical Research. Since 1925 he has been Secretary of the Royal Society and a member of the General Council since 1927.

Among the leaders of research in physiology from foreign countries may be mentioned Dr. R. K. S. Lim, Professor of Physiology at the Peking Union Medical College; Otto Frank of Germany of the University of Munich whose work on the physiology of the heart is internationally known; Dr. Eugene Gley, Professor of Physiology at the College de France; and Professor Rudolf Höber, President of the Deutsches Physiologische Gesellschaft and Director of the Physiological Institute at Kiel (he is the author of a work on the Physical Chemistry of Cell and Tissue).

THE BEAUMONT MEDAL

REVERSE SIDE OF THE BEAUMONT MEDAL

The fame of Dr. William Beaumont, U. S. Army surgeon who was born in 1785 and died in 1853, also a physiologist, was celebrated by the presentation of a book setting forth his studies on Alexis St. Martin to members of the Congress.

It is the custom of each Congress to commemorate the work of one of the earliest physiologists of that country in which the Congress is meeting. Since Dr. Beaumont is recognized as "the pioneer physiologist of the United States", this recognition seemed appropriate.

The speech in which Sir William Osler set forth Beaumont's claims to high rank has been reprinted and bound together with a facsimile edition of Beaumont's work on the Physiology of Digestion. This classical work is familiar to all students of medicine as a brilliant contribution to the Physiology of Digestion. During the present century, Pavlov has verified and advanced many of the findings of Dr. Beaumont.

The work of Dr. Beaumont was notable for many reasons. It was one of the first observations of its kind, and enabled many theories to be confirmed, and many others which have been postulated without access to first hand data to be exploded. It was notable for accuracy and completeness of the description of gastric juice itself. It confirmed the observation that the important acid of gastric juice was muriatic or hydrochloric.

It established by direct observation the profound influence of mental disturbances on the secretion of the gastric juice and on digestion and it was the first comprehensive and thorough study of the motions of the stomach, observations on which is based most of our present knowledge. Dr. Beaumont included in his study the very important work of determining the digestibility of different articles of diet in the stomach, one of the most important contributions ever made to practical dietetics.

One of his observations, constantly referred to, is little heeded after the passage of all these years. He said, "The system requires much less than is generally supplied to it. If more be taken than the actual wants of the economy require, . . . the residue becomes a source of irritation and produces a consequent aberration of function. . . . Dyspepsia is oftener the effect of overeating and overdrinking than of any other cause."

Beaumont served as an assistant surgeon during the War of 1812, and although he withdrew after the war he returned to service later, and was enabled to secure his greatest patient through his post at Fort Mackinac, located where the waters of Lake Michigan and Lake Huron unite.

This patient, Alexis St. Martin, lived to a good old age, dying in 1880, at the age of 76 at St. Thomas, near Montreal.

On Monday evening at 8:15 o'clock more than 1200 physiologists from all over the world assembled in Sanders Theatre, Memorial Hill, Cambridge for the opening meeting of the Congress.

Surgeon General Hugh S. Cumming of the United States Public Health Service gave an address of welcome on behalf of the United States Government. He was followed by Lieutenant Governor William S. Youngman who welcomed the members of the Congress on behalf of the Commonwealth of Massachusetts. President A. Lawrence Lowell greeted the Congress on behalf of Harvard University. The last of the addresses of welcome was delivered by the President of the Thirteenth International Physiological Congress, Professor William H. Howell of Johns Hopkins University.

Following these addresses Professor August Krough, Director of the Zoöphysiological Laboratory at the University of Copenhagen, Denmark, delivered the opening address of the Congress under the title of "The Progress of Physiology". Professor Krough stated in substance that "We are all aware that physiology is a rapidly expanding science in the sense that an ever increasing amount of work is being produced by an increasing number of workers, and the increase in the attendance at the international congresses bears witness to this fact. He had studied records and found that the number of papers published on physiological subjects is huge. Although not strictly comparable, their general tendency is unmistakable. In the first year of this century, titles

were given in the Physiologisches Zentralblatt of 3800 papers, and during the first decade only minor fluctuations took place. He finds from the Zentralblatt and Bibliographia 3900 in 1904, 3500 in 1907 and 4300 in 1910 but then a rapid increase took place and in 1912 the figure was 6700. He stated that he had no reliable statistics for the years from 1913-1919, but for 1920 the Jahresbericht gives the titles of 11,500 papers; for 1923 the figure is 14,000 and for 1926 it reached 18,000, and there is no doubt that the figures are increasing. He had the impression that physiological papers now were on an average shorter than 25 years ago, but a sample counting failed to substantiate this impression and showed the average length to be then as now 10 pages. This increase in publication is due to a number of causes and to some extent it may be unreal and due to more complete indexing, but there can be no doubt that much more work is now done by a larger number of workers than 25 years ago. It is interesting to note that in Zentralblatt for 1901 only 100 papers or 2½ per cent. were published in America or by American authors while the Berichte for 1926 shows about 3500 American papers, nearly 20 per cent. of the total". Dr. Krough then mentioned the development in special branches of physiology: "Our science has grown also in the sense that our understanding of many problems of fundamental importance has been broadened and deepened. We are all more or less familiar with the enormous expansion of knowledge in the field of nutrition and in the study of hormones. Less spectacular but equally important progress has been made in the physiology of muscle and nerve and in the problems of circulation. We have become acquainted recently with the long continued work of Pavlov and his school on the cerebral functions, and we can say that the investigation of the nervous system is making satisfactory progress in spite of its tremendous complication". Dr. Krough later mentioned the closer contact which has developed between physiology and the fundamental sciences: "Twenty years ago the application of statistical and mathematical analysis to our problems was very uncommon and unfamiliar to most physiologists, and there were even those who deprecated it violently. Though there is still room for much further progress the statistical weapons are wielded successfully by a large and increasing number of investigators".

In many ways the results and methods of pure chemistry and physics are utilized and successfully adapted to our problems and we can claim some reciprocity, since the use of micromethods, initiated mainly within our domain, where their services are invaluable, is spreading to other provinces of science. It is extremely gratifying from a general point of view to see how even the most advanced ideas and methods of physics and chemistry are inspiring the work of a few of our colleagues. Professor Krough stated that the words "from a general point of view" were used on purpose, because for his own part the fact shows that development is taking place along lines where he cannot follow and he believes that we have to admit that with the rate at which advance is now taking place in the sciences the useful span of life in the front line of research is likely to be cut short for many of us, because our viewpoints and even our methods become antiquated. Further emphasis was put on the growth of physiology.—Physiology is growing unwieldy. It is impossible for any single human being to be familiar with modern physiology in all its branches in the sense in which the great teachers of 20 or more years ago were familiar with the physiology of their time. We have to face the splitting up of physiology into more or less separate and independent sciences, and we are confronted with the problem of finding the right lines of cleavage. Dr. Krough also spoke of the relation of physiology to practical medicine: "Physiology as a science has taken its origin from the necessities of practical medicine, and even now the large majority of workers in physiology have had the benefit of a medical education and hold their appointments in medical schools. Nevertheless we all hold physiology to be an independent science, and most of the work done in physiological laboratories has no direct relation to medicine. The line of development which I think should be followed, is to establish in one direction a branch of physiology which is much more intimately in contact with practical medicine and in the other direction a branch which is much more independent".

"I think that work done on this side of the Atlantic has contributed more than anything else to the growing understanding of the fact that the problems of disease are mainly physiological and cannot be solved by the methods of clinical observation, morbid anatomy, bacteriology or serology alone, even in cases where these sciences are absolutely essential. It is the functional reaction of the organism to the attack of disease and to the therapeutic measures which is after all the central problem. A large and increasing proportion of physiological research is carried on in hospital laboratories by men and women who are at the same time practicing the art of healing. Much of this work is very valuable, but sometimes the outlook is rather narrow, and I believe that a great deal could be gained by expert physiological direction and co-ördination. I think the time has come when special chairs and laboratories should be established for the physiology of disease, morbid physiology or experimental medicine, if you prefer that name. The main point is that the leaders of such laboratories should have no regular duties connected with the treatment of patients, but they must have a small number of beds at their disposal for the temporary study of selected cases, and they must, of course, be in close and constant contact with the clinical wards. It goes without saying that they must have facilities for studying disease experimentally on animals. Within the field of blood circulation and innervation of blood vessels with which I am personally acquainted, I have had the desirability and even necessity of co-öperation with practical medicine brought home to me again and again. I have learned also that the theoretical problems regarding kidney function require for their solution a close study of clinical cases, and I cannot doubt for a moment that great benefit to patients will ultimately result from such a study. Much can be done in this direction by means of existing facilities, but I anticipate an acceleration of progress from the creation of special chairs as outlined, and I feel sure that the resulting contributions to practical medicine would amply and within a short space of time repay the communities for the initial outlay on such departments and for their maintenance."

"The other line of development which I would suggest is not perhaps such a pressing need, but

ultimately I believe it to be of scarcely less importance. It is the creation in the science schools and in close co-öperation with the departments of Zoölogy of chairs and laboratories for comparative physiology, animal physiology or zoöphysiology. I suspect that it is often used to denote just those aspects of a problem which are considered most important from an individual point of view. In my opinion a general physiology which can describe the essential characteristics of matter in the living state is an ideal to which we may hope that our successors may attain after many generations, and I want to emphasize that the route by which we can strive toward the ideal is by study of the vital functions in all their aspects throughout the myriads of organisms. We may find out, nay, we will find out before very long the essential mechanisms of mammalian kidney functions, but the general problem of excretion can be solved only when excretory organs are studied wherever we find them and in all their essential modifications. Such studies will be sure, moreover, to expand and deepen our insight into the problems of the human kidney and will prove of value also from the narrowest utilitarian point of view".

Dr. Krough continued: "I look upon controversy especially as one of our chief ways in which truth is approached. We may fondly imagine that we are impartial seekers after truth, but with a few exceptions, to which I know that I do not belong, we are influenced and sometimes strongly by our personal bias and we give our best thoughts to those ideas which we have to defend. Nevertheless we should all, of course, do our best to avoid controversy, in the sense that we should take every possible care to verify our facts and substantiate our conclusions before publishing our results". . . . "It is an almost invariable custom of editors of journals to reject papers which do not contain new facts. In such cases a more liberal interpretation of the rules of the journals would save the interest of our science, and I venture to think that the publication of papers discussing facts already known should be encouraged."

In closing, Dr. Krough said, "We have met together for friendly intercourse to be taught and to teach by demonstration of experiments and discussion of papers. The benefit to our science from a meeting like this is very great, although very difficult to estimate by visible results. Why should we not make this our Congress, which meets together regularly, into an instrument also for the organization of our necessary services, for the elaboration of rules of nomenclatures and for the protection of our scientific freedom. I believe that it can be done and ought to be done".

While the attention of the public was centered upon the arrival of world-famed physiologists and their public appearances, as they arrived in this country or left Boston on Friday for visits to various research centers throughout the country, the physiologists themselves were concerned with the results of their research during the last three years. Many advances have been made in physiology since the last meeting of the Congress at Stockholm in 1926, and these were the real object of the travels which these twelve hundred men and women made.

Growth, the action of the heart, radiation, insulin, adrenalin, the treatment of cancer, and the study of conditioned reflexes were a few of the subjects treated at the Congress.

On Tuesday morning, August 20, six sections of the Congress met in various buildings of the Harvard Medical School and in the auditoria of the Peter Bent Brigham Hospital and the High School of Commerce where subsequent meetings were held. The subjects of the discussions reading from section A through section E were the pharmacology and physiology of adrenalin, experiments on the nervous system, the physiology of the stomach, the action of the respiratory system and the reaction of the body to various pharmacological preparations.

On Tuesday afternoon five sections heard the presentation of papers on various subjects and a sixth saw demonstrations in histology and pathology.

The first of the meetings on Tuesday afternoon had two topics to discuss; nerves and nervous impulses was the first, and light and vision the second. The second meeting considered the action of the ductless glands, the third meeting treated the subjects of the rôle of water in surface tissues and bioelectrical phenomena. The fourth meeting presented the topic of metabolism and the fifth set forth its findings upon vitamins.

On Wednesday morning section A considered insulin; section B treated growth and feeding; section C dealt with the subject of muscles and their action. Section D discussed the study of the kidneys and section E presented pharmacological studies on the muscles. This sixth section explained the most recent findings of blood analysis.

The first section on Wednesday afternoon provided three moving picture demonstrations of microscopic studies. Section B treated insulin and the whole subject of diabetes. Section C presented the latest studies on proteins. Blood pressure, the capillaries and the carotid were the subjects of the papers in section D. Nutrition, diet, and reproduction were considered by section E. The sixth was devoted to moving picture demonstrations upon nine different subjects, most of them, microscopic studies. A further set of demonstrations was held on Wednesday afternoon, apparatus designed for electro-physiologic research, and for the analysis of respiratory and circulatory phenomena, and intricate apparatus for chemical analysis. The most refined and small scale demonstrations were those having to do with the measurement of nerve impulses, and heat production in nerves and muscle.

On Thursday morning there were six meetings and no demonstrations. Section A considered the Dynamic action of the heart; section B discussed the circulation of the blood and its relation to the lungs. Section C had concern with exercise and energy, and the effect of exercise upon the body. Section D treated of the organic acids. Hemoglobin and the chemistry of the blood were considered by section E. Section F discussed the pharmacology and the effect of certain drug preparations upon the tissues.

On Thursday afternoon there were four meetings and three demonstrations. The first meeting, that of section B, presented papers on diet and its chemical constituents. Section C treated sensory reactions and nervous impulses. Section E continued its discussion of blood in many of its aspects. Section F considered a number of pharmacological subjects, ranging from pharmacological studies on the autonomic nervous system to contributions to medical

cures made by the pharmacology of plants. The first group of demonstrations had to do with pulmonary pressures, real and artificial and optimum temperatures for men at work. The remainder are so varied in nature as to defy any group description.

The closing scientific sessions of the Congress were held on Friday morning, and of those the first section was the most complete unit for it treated of conditioned reflexes and the experiments growing out of the researches on conditioned reflexes. Section B discussed longevity and death. Section C treated the chemistry of the muscles, with particular reference to the rôle of creation in muscular action. Section D discussed circulation and the output of the heart. Section E considered radiation and its effect on cell and tissue. The sixth section presented papers upon bacteria and serums.

Ten minutes were allowed for the presentation of each paper and five minutes for discussion.

There were in addition to the papers presented at the seven scientific sessions of the Congress a number of other papers read by title. These covered the same subjects as those discussed in the Congress, but were the work of members who were either unable to attend or who presented more papers than the restricted time of the Congress permitted them to read.

In addition to the scientific sessions a number of entertainments had been planned, including excursions for wives of the members to nearby points. Following the opening meeting on Monday evening there was a reception to the members of the Congress in the Harvard College Yard. Refreshments were served. The arrangement of the Yard resembled that of Class Night and there was music as on Class Night. The Widener Library and the Fogg Museum were open to members of the Congress on that evening.

On Tuesday there was an excursion to Lexington and Concord, and after a tour of the historic spots tea was served at the Concord Country Club. At 4 and 6 o'clock on Wednesday afternoon there was a Garden Tea at the Longfellow House on Brattle Street in Cambridge, and on Wednesday evening at 9 o'clock there was a reception in the court of Harvard Medical School. This reception was tendered to the members of the Congress by the Dean and Faculty of the Harvard Medical School. Following the reception Arthur Fiedler conducted a concert by members of the Boston Symphony Orchestra.

Thursday afternoon, from 4 until 6 o'clock, tea was served for the wives of members of the Congress at the Brookline Country Club. In the evening at 8 o'clock, a dinner tendered by the Federation of American Societies for Experimental Biology was held in Memorial Hall, Cambridge.

At 2:30 on Friday afternoon the closing exercises of the Congress were held in Sanders Theatre, Memorial Hall, Cambridge. An address entitled "Reminiscences of the Early Days of the Physiological Congresses" was delivered by Professor Leon Fredericq, President of the Second International Physiological Congress which was held in Liege in 1892. Professor Fredericq is Professor Emeritus at the University of Liege. At 3:15 on Friday the Report of the International Committee of the Congress was presented.

Following the scientific sessions in Boston, members from abroad and their families were given an opportunity to visit the Marine Biological Laboratory at Woods Hole. A clam bake was held at Woods Hole on Saturday. Arrangements were made for them to visit scientific institutions and other points of interest in and around New York City during the following week. An excursion of one day was made to visit Yale University. Throughout this week the foreign physiologists and their families will live in dormitories of Columbia University as guests of the Federation. On Saturday morning, August 31, the New York visit will be concluded so that members can sail for European ports on that day.

The International Psychological Congress will be held September 1 to 7, so that physiologists who are also interested in this congress can readily attend it after the visit to New York.

A week's tour has been arranged for members abroad who desire to spend a short period of time in travel in America. The party will leave New York on Saturday, August 31, will go by steamer up the Hudson River to Albany, thence by railway to Niagara Falls and Toronto. After visiting the University of Toronto the party will proceed by boat on Lake Ontario and the St. Lawrence River passing through the Lachine rapids. The trip will terminate at Montreal. While in Montreal, McGill University will extend certain courtesies to those making the trip. It is expected that members of the party will return to Europe by the St. Lawrence route, or certain of them may prefer to return to New York or visit other places in the United States.

The Boston Congress was signalized by just as free an exchange of scientific ideas between physiologists of many nationalities as has marked these meetings in the past and continued to fulfill the aims of Sir Michael Foster in his letter to Professor Kronecker "to do our best to make it as informal as possible, so that we may freely and without reserve exchange opinions".

(To be continued)

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

September 27-28—New England Surgical Society. Detailed notice appears on page 1227, issue of June 6.

October 7-19—New York Academy of Medicine. Detailed notice appears on page 468, issue of February 28.

October 13-18—General meeting of the International Society of Medical Hydrology and International League for Combating Rheumatism. Detailed notice appears on page 288, issue of August 8.

October 21, 22, 23, 24, 25—International Assembly of the Inter-State Post-Graduate Medical Association of North America. For detailed notice see page 341, issue of August 15.

November 4, 5, 6 and 7, 1929—Clinical Congress and Eighth Annual Meeting of the American College of Physical Therapy. See page 149, issue of July 18, for details.

December 2-6—The Radiological Society of North America. Complete notice appears on page 149, issue of July 18.

May 5-10, 1930—First International Congress on Mental Hygiene. See page 191, issue of July 25, for details.

DISTRICT MEDICAL SOCIETY

Norfolk District Medical Society

Schedule of meetings for the year 1929-1930. Invitations have been sent to the speakers and the list is true only on condition of their acceptance.

October 29—Medfield State Hospital, Harding, Massachusetts. Papers by the Staff.

November 25—Roxbury Masonic Temple. Dr. Roger Graves, "Urology from the Standpoint of the General Practitioner." Surgical discussion. Medical discussion.

January 27, 1930—Roxbury Masonic Temple. "Recent Advances in Diagnosis and Treatment of Syphilis." Speaker to be announced.

February 24, 1930—Roxbury Masonic Temple, 8:00. Dr. Edwin H. Place has been invited to read a paper and has been given carte blanche in the selection of his subject.

March 24, 1930—Roxbury Masonic Temple. Dr. Burton E. Hamilton. Subject to be announced.

May 6, 1930—Annual Meeting. Program to be announced.

The Censors meet for the examination of candidates, November 7, 1929, and May 1, 1930, in the Roxbury Masonic Temple, 171 Warren Street, Roxbury, at 4:00 P. M. Applications must be in the hands of the Secretary at least one week previous to date of examination.

Owing to inability to engage the Roxbury Masonic Apartments on the last Tuesday of the month, such meetings as will be held in the Roxbury Temple will be held Monday evenings as per the dates above.

FRANK S. CRUICKSHANK,
Secretary, Norfolk District Medical Society.

BOOK REVIEWS

A Manual of Diseases of the Nose, Throat, and Ear. By E. B. GLEASON, M.D. Published by W. B. Saunders Company. 1929.

This book, now appearing in the sixth edition, is a manual of 600 pages designed to furnish the student and practitioner with the basic essentials of otolaryngology. A clear text is somewhat scantily illustrated but covers the subject concisely and without the confusion of varied points of view.

As a preliminary to the usual textbook formula of anatomy, pathology, symptomatology and treatment, there is an introductory chapter dealing with the technique of examination of the nose, throat and ear, thus providing the basis for a proper appreciation of the subsequent subject matter. There follow in order, a consideration of the nose, the pharynx, oropharynx, the larynx, and the ear. The latter subject is appropriately divided into the diseases of the external, middle and internal ear, and further includes intracranial complications and disorders of the vestibular apparatus. There is a concise account of such general diseases as may show otolaryngological complications.

The subject of the operative surgery of the ear, nose and throat is dealt with somewhat briefly, stress being placed primarily on the mastoid. A most valuable and somewhat novel addition is to be found at the end of the book where a very complete list of formulae is appended together with a description of the disease in question and full directions for application of the particular medication. This feature of the book will be found to be of great value to the specialist. The book, in general, will find its chief use as a textbook for students and a handy reference work for the general practitioner.

Otosclerosis. Published by Paul Hoeber. Compiled by the Committee on Otosclerosis, American Otological Society. Price $15.00 net.

At the annual meeting of the American Otological Society in 1924 a committee was formed for the purpose of an intensive study of the entire subject of otosclerosis. One outcome of this study is a two volume book entitled "Otosclerosis", which contains a résumé of all the available literature published up to 1928. These volumes, one of 400 pages, the other of 250, cover the topics of the pathology, etiology, symptomatology, diagnosis and treatment of this baffling disease. The text, edited and condensed from the original sources in various languages, avoids any direct quotations and fuses smoothly an otherwise complex and disjointed mass of individual publications, many of them wholly inaccessible to the average reader. The resources of the largest medical libraries in the United States—the Surgeon Generals and the Library of the New York Academy of Medicine—have been made use of in the completion of this work. Its chronological arrangement shows the development of the present knowledge and understanding of otosclerosis in all its phases. Pathological findings of various investigators are presented in detail, together with numerous theories in regard to the etiology, and the wide range of possibilities as to future investigation of this great problem.

The two volumes bring to the otologist in an easily usable form all the available data on the subject. There are no illustrations, cuts or plates. The text is clearly printed and the whole appearance gives the pleasing effect characteristic of books of this publishing house.

Handbook on Venereal Diseases. By W. TURNER WARWICK, F.R.C.S. Published by Faber and Gwyer, Ltd., London. 221 Pages. Price $6.00.

A short book on venereal diseases particularly designed to serve as a guide to nurses.

The economic importance of gonorrhea and syphilis in England is stressed, and a description of the existing legislation and organization for their control is given. Outlines of the course of the diseases follow with routines for treatment.

This should be a useful contribution for the teaching of nurses and others in the care of venereal diseases.

What Everyone Ought to Know. By OLIVER T. OSBORNE, M.D. Published by Charles C. Thomas, Springfield, Illinois. Price $2.50.

The jacket of the book states that it is a "complete health book", that it is "practical, without theories and in simple language". On the fly leaf is given a long list of the professional connections of the author and what he has hitherto published. The good taste of this is to be somewhat doubted.

The second paragraph of his preface states, "various infective causes of ill health are listed, and how they are acquired and the efficient measures of prevention are described". The poor English and arrangement of this sentence is distinctly jarring. The book consists of some 300-odd pages and is divided into 17 chapters. There are many such books on health for the laity on the market at the present time. Most of these do remarkably little harm. The bigger and broader-gauge the writer and the greater his experience, the more apt are his statements and theories to be sound. There should be no place in such a book for petty fads and idiosyncrasies of the author's own choosing.

The first chapter is on growth and development in which the monthly normal growth of the child is recorded. His chapter on eugenics is excellent and stresses exactly what we are doing all over this country, namely, prolonging the lives of the unfit. His sections on old age are very good. I like particularly his statement that while "sanitary medical science is decreasing the infections and deaths due to food and water poisons it is not decreasing the incidence of circulatory and some organ degenerations" and likewise that "scientific care prevents the

death of many defective children, therefore, many ill-conditioned infants live to reach childhood and some reach early adult life carrying handicaps".

Chapter II is on the functions of the body. He mentions that "good breathing improves the blood flow in the liver". It is not clear to me how this is done. Also, he states that it is the iron constituent of the blood which changes the carbon dioxide to oxygen and that arterial blood is scarlet because it contains the greatest amount of oxygen. These, however, are details. He is rather fond of split infinitives which, personally, I dislike extremely as, for instance, "In other words, they (the ventricles of the heart) must be full to *well* contract". He states that water in the tissues in small amounts is called oedema; in large amounts dropsy. This distinction will not be accepted. Again in discussing kidney conditions he says that "anything which raises one's blood pressure will increase the amount of urine excreted, and the reverse". This is manifestly not so. Under the section of sleep he states that if anyone is drowsy there is some cause. Undoubtedly there is some cause but generally a perfectly normal and natural one. He is extremely opposed to daylight saving and is convinced that it is doing harm and creating hardships in many cases.

Chapter III is devoted to nutrition and in general is an excellent chapter although some of his detailed statements would not be accepted. His advice against the now popular high enemas and colonic lavage is sound and he believes that the term, intestinal intoxication, and similar ones are much over-used. He places yeast as a cure-all where it belongs, namely, in the junk heap, and warns us that mineral oil is an abused fad.

The first part of Chapter IV on foods is excellent, his paragraph that there is no distinction between red and white meat and between fish and chicken being one that is particularly needed. He puts the subject of vitamines plainly and clearly. He is convinced that tea and coffee are bad and makes the statement that probably 30,000,000 people in the U. S. drink more coffee than is good for them. He gives some quite unnecessary morbid details concerning coffee marathons which do not help his book. Again in this chapter he deplores daylight saving.

Chapter V on diet is an excellent one, particularly where he states that "it is a mistake to believe that everyone who has high blood tension is benefitted by not eating meat" and "going without breakfast is a fad" and "going without lunch is fad". He gives some very sane and sensible remarks on obesity.

Chapter VI is entitled "Health Axioms". Some of these are good and some are not. For instance, "children must have rest periods"; "each child should have periods of being alone and amusing himself"; "too much is done for children"; "young children should not be taken to the movies" are full of sound, common sense. Dr. Osborne is an ardent advocate of the theory that the bristle toothbrush is simply a laboratory of bacteria, does more harm than good and should be abolished. It is utterly impossible for me and indeed for the majority of sane persons to accept this theory. He states that one should not use the public telephone without placing a clean handkerchief over it, otherwise one is apt to get all kinds of diseases. This undoubtedly is an exaggerated statement. His section on choosing a physician is very good but will not be enjoyed by the osteopath, Christian Scientist or chiropractor. He gives excellent sections on clothing and shoes, bathing and swimming and calls attention to the dangers of the ultra-violet fad of the present day.

Chapter VII is on the mouth, which he discusses in detail, and on growth and care of the teeth. Again he pays his respects to the bristle toothbrush. He says that ulcer of the stomach and appendicitis can come from germs carried in the mouth. His statement can hardly be accepted but on the other hand one welcomes, "Too many teeth are extracted without local or general excuse". Here again he devotes a special section of three pages to the dangers of the bristle toothbrush. His remarks on the tonsils are good but he overemphasizes the lingual tonsil and the trouble it causes. After a good many years of experience I have never been able to convince myself that the lingual tonsil ever did or caused anything.

Chapter VIII on the child is sound and sane. Chapter IX is entitled "Some Statistical Facts". The only trouble is that what he calls "facts" are really statements and are interesting but not entirely true.

Chapter X is devoted to physical exercise. He emphasizes quite properly that exercise, athletics and particularly competitive athletics are tremendously overdone and in the midst of good, sound common sense speaks of the constant inhalation of automobile exhaust as a cause of much harm! He is strongly opposed to girls smoking and uses some exaggerated language in regard to this. He seems to forget that in practically all of the English colleges athletes are allowed to smoke and to drink during their period of training. His remarks about football and its dangers are much exaggerated and he states that competitive rowing may do serious harm to the heart and some hearts may never recover their former strength and normality. It is a pity that Dr. Osborne did not look up the facts and scientific studies in regard to rowing. His statement is very far from the truth as any man interested in rowing will know. There is far too much of his own personal point of view in this chapter to make it as effective as it otherwise would be.

Chapter XI on infection is full of common sense. I regret that he uses the word "pusy" as frequently as he does. In the first place, I doubt if there is any such word and in the next place if there is such a word I doubt if it is spelled correctly.

Chapter XII is on the prevention of disease and is naturally to be expected in attempting to cover such an enormous subject in one short chapter it is too superficial to be of much value. Again he speaks of the lingual tonsil as the cause of many coughs.

Chapter XIII is on habits which with the exception of extreme remarks in regard to tobacco is excellent.

In Chapter XIV he covers the subject of accidents and here again attempts to put altogether too much in one chapter but his remarks on the management of emergencies are very useful.

Chapter XV, which is short, brief and as far as it goes sound, is on poisons. In Chapter XVI on the skin he attempts to cover most of the skin abnormalities and as far as he goes has given good advice. Chapter XVII on nostrums and quackery is excellent.

On the whole I do not see that this book can do anything but good. His own personal feelings in regard to tobacco, daylight saving and toothbrushes are

such evidently extreme ones that they will be overlooked. So far I have dealt lightly with Dr. Osborne's idiosyncrasies in regard to the toothbrush, tobacco and especially tea and coffee. I do not feel that I would be doing my duty toward the medical or the lay public, however, unless I included verbatim a paragraph from his chapter on "Foods" on page 89 of his book and the reply made to it by Professor Prescott, who is referred to in the paragraph. This paragraph is as follows:

"Coffee and Tea.—Professor Samuel C. Prescott, working at the Massachusetts Institute of Technology, received $40,000 from the Coffee Trade Publicity Committee for a research on coffee. The report of this research reached the public in 1926, and the part utilized by the coffee interests for advertising purposes stated that coffee was practically harmless. These advertisements tended to nullify all that had been said by medical men as to the harm that coffee could do some people, and consequently the sale of coffee increased."

I wrote at once to Professor Prescott asking for the truth in this matter as I did not consider it possible that Dr. Osborne had given the correct impression. Professor Prescott, head of the Department of Biology and Public Health at the Massachusetts Institute of Technology, wrote me under date of August 15th as follows:

"I am interested to have your letter of the 13th, and to have the quotation from Dr. Oliver T. Osborne's book. If the rest of the book is based on as good authority as his statement about my report I am sure it is misnamed.

"I have no doubt that Dr. Osborne is a good man, but he has no desire to be fair so far as coffee is concerned. He has already tried to make trouble for me, and to imply that I sold an opinion for money regardless of the truth. I do not think he can be 'put right' on the subject of coffee, or of my report, which distinctly stated that for a small percentage of people coffee is unquestionably undesirable. When I tell you that more than 700 articles were carefully read and weighed before any part of the report was written you may see that my opinion was not a snap judgment. Incidentally, I might add that the $40,000 which he so glibly quotes was considerably less, and that it was the sum which paid for at least six or seven workers over a period of more than three years. He would like to give the impression that this was my price for an opinion that would please the coffee interests."

PROBLEMS OF MECHANICAL REFRIGERATION

Several deaths, which have occurred recently in Chicago, have been attributed to poisoning by methyl chloride which leaked from refrigerating systems. These have received wide publicity, and have caused apprehension, even among the users of refrigerating equipment entirely unlike that to which the fatalities have been attributed. It is the purpose of this statement, authorized jointly by the Public Health Service, the Bureau of Standards, and the Bureau of Mines, to state the essential facts regarding this danger and to relieve any undue anxiety in the minds of those possessing household refrigerating systems.

All refrigerating systems in practical use depend for their operation upon the repeated gasification and condensation (sometimes by dissolving or "absorbing" in another substance) of a material which is technically called a "refrigerant". In most cases the refrigerant is confined under pressure in the refrigerating machine, and if it escapes from the system, becomes a gas which mixes with the surrounding air.

For many years the gas ammonia was almost the only refrigerant used. For technical reasons, other refrigerants have more recently been introduced and are now extensively employed. Sulphur dioxide and methyl chloride are the most important of these.

None of the three refrigerants mentioned, ammonia, sulphur dioxide or methyl chloride, can be breathed with impunity, but none are violent poisons when breathed for a short time in low concentrations. If the same amount of the three substances is considered, methyl chloride is the least poisonous of the three; but because their physiological effects are quite different it is hard to make a quantitative comparison. Sulphur dioxide and ammonia both have strong odors which are easily recognized and are so irritating that no one is likely to breathe much of them if escape is possible. Methyl chloride has a slight and rather pleasant odor, which probably would not awaken a sleeping person and might not be recognized by one who was awake. To this fact is to be attributed any greater hazard from methyl chloride.

Most of the trouble attributed to methyl chloride has occurred in connection with multiple refrigerating systems installed in apartment houses in which a single compressor delivers the refrigerant through tubes to the refrigerators in the several apartments. A large majority of the individual household refrigerators of the motor driven ("electric") type now in use employ sulphur dioxide as the refrigerant. Nearly all, if not all, of the domestic refrigerators, the operation of which depends upon supplying heat instead of mechanical compression, use ammonia. This class includes a few electric refrigerators of unusual type and all of the gas-fired refrigerators. The escape of the refrigerant from the more commonly used household refrigerating systems would, therefore, be at once made evident by its odor.

Newspaper headlines and statements to the effect that the fatalities in Chicago were caused by "gas refrigeration" without doubt had reference only to the fact that refrigerants are gases. "Illuminating" or fuel gas was in no way involved.

The high volatility of all practicable refrigerants makes it quite improbable that enough of these substances could be retained in food stored in the refrigerator to be harmful.

Methods for eliminating the danger from methyl chloride systems are being studied. It would be premature to say whether the end will be accomplished by replacing methyl chloride entirely by other refrigerants, by adding something which will give the refrigerant a sufficiently powerful odor, or by so improving the mechanical construction of the equipment that leakage will not occur where the gas might enter rooms in which people live.

It should be recognized that the number of serious accidents from household refrigerating systems has been small in comparison with the number of such systems in use, and improvements may be expected which will much reduce the small hazard that does exist.—*United States Public Health Service.*